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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O FEBRUARY 17, 1898. CHICAGO, ILL. NUMBER 7

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. FEBRUARY 17, 1898. CHICAGO, ILL. NUMBER 7

THE WEEK IN IRON CIRCLES.

The market has quieted somewhat, following the large purchases of Bessemer iron reported last week. The developments of most importance are the establishment of a price basis for Lake Superior Bessemer ores from old ranges, at 15 cents a ton above the basis of 1897, making the base ore $2.75, instead of $2.60, and the meeting of Southern producers of pig iron to consider an advance in prices and the establishment of a selling commission. Further consideration of the latter proposal is to be had this week. Meantime no advance in price has been made, and while some furnaces are holding for $7.25, Birmingham as a minimum for No. 2 foundry, buyers find others who are making prices as low as at any time in two months. For the present, buying of foundry irons is light, but with the approach of the active months of the year a good buying movement is looked for. Buyers have little fear that the market will get away from them, though recognizing that for January, with its usual quietness, the 30,000-ton accumulation of stocks was very moderate, with production greater than in December. The significant feature of the whole situation is the enormous output of finished material and the extent to which capacity for billets, sheet and tin plate bars and wire rods is engaged for months to come. Unless all precedents are reversed, this consumption, unusual as it is for winter months, will be greater in the spring. The single item of barb wire shows a heavy tonnage, and the wire nail demand is such, even with the country's great capacity, that prices have advanced. Export shipments have come to be a factor in this trade, and the general knowledge that the wire combination can scarcely fail now, has its influence on prices. The Pittsburg situation, that monopolized attention a week ago, is less commanding at the moment. It does not appear, as the facts develop, that any valley iron has been taken for shipment to the Chicago district, but such a possibility is not remote. Nor is it likely that Pittsburg requirements for the next two or three months have been met. The possibility that some short sales by intermediate interests to Central Western steel works are not all covered, is another interesting feature. Quotations continue to be made at $9.75, valley furnace, for March delivery; but iron can be had below this, and the fact that offers at $9.60, made by furnaces in the past week, have not taken business would indicate that iron for the first quarter is still on a $9.50 basis. The billet market is firmer. Pittsburg mills, being well sold up, are advancing their minimum to $15.25, some quoting above this. Wheeling district mills, however, have sold at delivered prices equivalent to $15, Pittsburg. The well-sold condition of steel works generally argues a firm billet market for some time to come. The sustained demand for steel rails has been a surprise, in view of the heavy buying for 1897 and the large amount booked at the opening of this year. It is questionable if all the promised deliveries of rails can be made in the first half of 1898. Plate and structural mills are well occupied and pool prices on beams promise to be maintained by a good supply of work. On the other hand bar iron agreement seems improbable. Prices in Eastern and Western markets are unprofitably weak. Sheet mills in the Central West find larger business and better prospects than are reported in the East. Tin plate buying has been of larger proportions the past week, but there is no evidence that the consolidation proposition is yet taken seriously. The chances are against co-operation by the large New York dealers and no plan has taken shape for a combination of manufacturers solely.

CLEVELAND.

Office of *The Iron Trade Review*,
27 Vincent St., Feb. 16.

The meeting on last Saturday of Bessemer ore producers of all Lake Superior ranges except the Mesabi has put the ore situation in definite shape for 1898. The advance in price is practically that indicated heretofore. The suppositious ore taken as the basis of calculations, containing 63 per cent of iron, .045 per cent phosphorus and 10 per cent natural moisture, will sell at $2.75 a ton, instead of the $2.60 of last year. This conservative advance is not likely to tempt many idle properties to become active, being but a trifle more than the increase in labor cost already made. The method of computing the prices of the 45 or 50 old range ores, relative to the base ore, is precisely the same as that employed last year, the phosphorus table, which, on its first appearance in 1897, was counted a triumph of mathematics as applied to the accurate measurement of mixture values, being retained in its original form. Each ore takes the place to which it is entitled by the average analyses of 1897, or such as the producer will guarantee for 1898. It is not to be inferred that there is a horizontal advance of 15 cents from the 1897 price, or even an average advance of 15 cents. Ores run higher or lower in phosphorus or iron in one year, than in the preceding, as the deposit improves or deteriorates. It happens thus that one ore on the 1898 list is 2 cents a ton lower than in 1897. In another case where the average of 1897 analyses shows a considerable improvement, there is an advance of 22 cents. The price schedule is thus an accurate index of the relative values of the different ores as they will come upon the market in 1898. The estimated output for the year is a trifle over 6,000,000 tons of old-range Bessemers—or such as will enter Bessemer mixtures—the old phosphorus limit of .07 being retained. Several ores are included in the schedule for 1898 that were not there in 1897—the Rex grade of the Chapin's product, and the Old Mine Hematite, for example. The total of such ores is 600,000 to 700,000 tons. Putting Mesabi ores at last year's output, about 4,200,000 tons, and making an allowance for scale, mill cinder, etc., it is estimated that the material going into furnaces running on Lake Superior Bessemer ores is now equivalent to 11,000,000 tons of ore per year. How much beyond the 1897 total of 12,500,000 tons the figures for 1898 will go, is now only a matter of conjecture. It will be understood, from what is said above, that the Mesabi range is to take the course of last year. Already something like 1,000,000 tons of Minnesota Iron Co. Mesabi ores have been bought by the Illinois Steel Co. It is believed the prices in this deal, while not absolutely fixed as yet, will give the Chicago interest Mesabi ores at practically the same cost as the leading Pittsburg interest commands through mine ownership. It is to be expected that transactions in old-range Bessemers will follow soon upon the completion of the figuring of prices; the schedules will be finished probably within 10 days. The question of lake freights is discussed in only a tentative way. The early charters of 70 cents last year were followed soon after by 65-cent charters to Nov. 1, with 60 cents as the rate to Sept. 1. No great departure from a 65-cent basis is anticipated for 1898 business.

PIG IRON.—There is some variation in reports of the Bessemer market, following the heavy buying noted last week. The Chicago interest has not bought any valley iron as yet, so far as can be learned; and the Carnegie Steel Co., while it might take more iron later, has not added to the original 75,000 tons. The quotation of $9.75 for March, April and May

iron has failed to take business this week, and $9.60 has been quoted in the past day or two for February, March and April, without being accepted. For prompt shipment, $9.50 is still the market. Furnaces are asking higher prices, both for early deliveries and for the next two or three months, while some quote $9.85 to $10 for second quarter iron. The belief that a short interest will be called on for considerable iron in the next few months makes all sellers quite firm. Foundry iron is unchanged. For the present buying is light. Valley furnaces have found some low figures quoted on Southern irons in Eastern territory, and are meeting prices. For gray forge there is considerable inquiry, with sellers naming higher figures on later deliveries. Valley quotations are $8.50 to $8.75. Users of charcoal iron are quite well filled up at the low prices recently prevailing and a quieter market is looked for. We quote f. o. b. Cleveland:

Bessemer	10 15@10 40	Valley Scotch No. 1	$10 40@10 65
No. 1 Strong Foundry	10 40	Valley Scotch No. 2	9 90@10 15
No. 2 Strong Foundry	9 90	Gray Forge	9 00
No. 3 Foundry	9 40@ 9 50	Lake Superior Charcoal	11 00@11 50

FINISHED MATERIAL.—Local rolling mills, steel works and wire and nail mills are generally running full, some of them making unusual outputs. The past week has brought no large contracts, but demand is maintained, with indications of larger volume as the season advances. Local and near-by producers of billets, sheet bars and wire rods have a large tonnage on their books, indicating unusual activity among finishing mills that go into the market for these materials. A local railroad is in the market for 1,500 tons splice bars. In all lines of railroad material the demand is good. We continue to quote beams and channels at 1.15c, Pittsburg; bar iron and bar steel at 1c to 1.05c, Cleveland; No. 28 sheets at 2.10c, Cleveland; tank plates, 1c, Pittsburg. Wire is strong at $1.20 to $1.25 for smooth and $1.75 for four-point galvanized. Wire nails for February are firm at $1.45, Cleveland mill, car load lots, and $1.50 for March. The old material market shows continued demand for cast scrap, at $8.25 to $8.50. No. 1 railroad wrought is quoted $11.75; old car wheels, $11 to $11.50; old iron rails, $13.50 to $13.75; old steel rails, $10.50.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1142 MONADNOCK BLOCK, Feb. 16.

Nothing of special interest has come up in the week. There has been a good tonnage of orders closed for most kinds of iron and steel, and the demand shows no falling off. Very few large contracts for any kind of material have been closed, and there are none in the market at present. Buyers are taking their material as fast as they had contracted for it, and in some cases are asking mills and furnaces to advance shipments somewhat. This is particularly true of pig iron.

PIG IRON.—Sales last week kept up the rate of recent weeks, and inquiries are keeping up at an even pace. No important sales were made last week, and there are no large buyers in the market. One or two contracts as large as 1,000 tons were made, but most of the business comes in lots of from 200 to 300 tons and less. Most Northern and Southern furnaces are holding for quoted prices, although some reports are current of sales below quotations. The meeting of Southern producers at Birmingham has not yet resulted in anything important. It is understood that some arrangement is proposed for uniting selling departments under one head or commissionership, prices to be controlled by the commissioners, and allotments of tonnage made. It is not expected, if such an arrangement is made, that it will interfere with the present representation of the furnaces in the various selling markets, but only that all sales made will be handled through the commissioners instead of going direct to the companies themselves. There have been only a few sales of Lake Superior charcoal iron, the heavy buying at cut prices having subsided somewhat.

Lake Sup. Charcoal	$12 00@12 50	South'n Coke No. 3	$10 10@10 35
Local Coke Fdy. No. 1	11 00@11 50	Southern No. 1 Soft	10 60@10 85
Local Coke Fdy. No. 2	10 50@11 00	Southern No. 2 Soft	10 35@10 85
Local Coke Fdy. No. 3	10 25@10 50	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 50@11 00	Alabama Car Wheel	16 00@17 00
South'n Coke No. 1	10 60@10 85	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 35@10 85	Coke Bessemer	11 50@12 00

BARS.—The appointment for a meeting of bar iron mills last week was recalled on the day previous to the 9th. No further attempts have been made to get the mills together, and nothing will be done about it for the present. Business last week was mostly confined to comparatively small lots, but the aggregate of these was very satisfactory. The demand for iron and steel is good from all kinds of trade, and new buyers are coming into the market all the time. Prices are about as last reported. They are made at 1.05c to 1.10c for common iron, 1.10c to 1.15c for guaranteed iron, and 1.10c to 1.15c for soft steel bars from strictly billet stock.

CAR ORDERS.—There continues to be a good demand for material entering into car construction. Car orders were not so large last week as heretofore and only one or two contracts of any size were closed.

RAILS AND TRACK SUPPLIES.—Rails continue to be in good demand, and the sales made last week footed up a good total. Quotations are unchanged, as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.20c to 1.30c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.60c to 1.65c.

BILLETS AND RODS.—The local mills are sold up so fully that they are unable to accept orders except for small lots. Some business has been done in this market by Eastern mills, at $17.50 for billets and $24.50 for rods.

STRUCTURAL MATERIAL.—Business last week did not include any large orders. A contract soon to be let is that for the new Conkey building, at Hammond, Ind., which will take about 500 tons. The market on plates is slightly off, and quotations are reduced accordingly. Quotations are made as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.15c to 1.25c; plates, 1.10c to 1.15c; tees, 1.35c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—There has been a fairly good demand, and sales last week, while not especially large, were generally satisfactory to the mills. Most of the business placed was in small lots. Prices are as follows: Tank steel, 1.10c to 1.15c; flange steel, 1.40c to 1.45c; fire box steel, 1.85c to 5c.

SHEETS.—Both galvanized and black sheets are in good demand, and sales are reported to be fully as large as could be expected at this season of the year. Dealers refer to the situation to be very encouraging, and they are looking for a good spring trade. Quotations are made at 2.15c to 2.20c for No. 27 black, and 80 and 7½ to 80 and 5 per cent discount for galvanized.

MERCHANT STEEL.—Local dealers note a steady demand, with a good tonnage closed every week. Several good sized contracts were made last week, and further business of this character is pending. Prices follow: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.45c to 1.50c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—The shortage of cast scrap has not been made up yet, and seems likely to continue for some time. Consumers are not buying heavily although one or two large transactions were closed last week. Dealer's selling prices are unchanged, and are made as follows:

Old iron rails, gross	$12 00@$12 50	Axles, net	$14 00@$14 25
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 25@ 9 50	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	11 00@ 11 50	Axle turnings, net	7 25@ 7 50
Railroad forge, net	12 00@ 12 50	Mixed steel, gross	7 00
Dealer's forge, net	9 50@ 10 00	Stove plates, net	6 00@ 6 25
No. 1 mill, net	7 50@ 8 00	Heavy melting steel, gr.	8 00@ 8 25
Heavy cast, net	8 50@ 9 00	Old iron splice b., net	13 25@ 13 75
Malleable cast, net	8 00@ 8 50		

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, Feb. 16.

Higher Bessemer iron is being felt in other directions and prices on other pig irons and on some rolled products are firmer. Bessemer iron has not sold in any large lots since the big movement, and ideas as to prices vary considerably. Pittsburg finishing mills, almost without exception, are running to their full capacities and making tonnage records never before equaled.

PIG IRON.—A number of odd lots of spot Bessemer iron—about 10,000 tons in all—have been bought and sold since the Carnegie purchase of two weeks ago and on these prices have been $9.50 to $9.60. Prompt iron is well cleaned up and furnaces are slow to quote on long deliveries. Iron for March, April and May is quoted at $9.60 to $9.75 and beyond that $10 is asked. Foundry iron has shared somewhat in the

Bessemer rise, a firmer feeling being reported. For gray forge there is more demand but less inclination to sell, at present prices for forward deliveries. Quotations are made as follows:

Bessemer, first quarter valley	$ 9.55 to	$ 9.75
Bessemer Pittsburg	10.15 to	10.35
No. 1 Foundry	10.40 to	10.50
No. 2 Foundry	9.90 to	10.15
No. 3 Foundry	9.50 to	9.75
Gray Forge	8.90 to	9.00

BILLETS.—There has been some heavy buying in billets during the week. Mills generally are well booked and one local mill asks $15.50 at mill. We quote $15.25 maker's mill.

SHEET BARS.—The quotation is $17 to $17.25 for sheet bars at mill, with sellers quite firm.

RODS.—The demand for rods is unabated and they are still scarce at $23, maker's mill.

PLATES.—The plate market presents an odd situation. Universal plates are very firm at 1.1c, whereas sheared tank plates are quoted at 1c and attractive lots have been taken of late below 1c. The immense universal mill, on which work is about to be begun at Homestead, will not be completed too soon, apparently. Better grades of boiler and fire box plates are moving actively and maintaining prices. Mills quote: Bessemer and open-hearth tank, 1c; shell, 1.10c; flange, 1.20c.

STRUCTURAL MATERIAL.—The last two weeks have opened up structural work in large quantities, included in which are several individual projects of considerable size. Bids have already been offered either directly or indirectly on the 12,000 tons of structural shapes that will be needed on the new East River bridge in New York. The award will be made on Feb. 28. The clash among State officials has postponed active figuring on the Pennsylvania State Capitol and the matter is in abeyance. Present structural business is remarkable for the smallness of individual orders. Agreed rates are holding and are quoted as follows f. o. b. mill: Beams, 3 to 15 inches, 1.15c ; 18 to 24 inches, 1.25c; zees, 1.15c; tees, 1.20c. Universal plates in connection with other shapes are selling as low as 1c; alone, 1.10c.

FERRO-MANGANESE.—Ferro has been much in demand for a week and sales of 80 per cent. domestic are reported at from $47 to $47.50.

RAILS AND TRACK SUPPLIES.—In the tardy reports, circulated by the daily press during the week, of the rail agreement consummated a month ago, it was erroneously stated that 30 foot T rails were fixed at $17.50, Pittsburg. The agreed rate, $18 is so far intact. Eastern rail mills are fairly well covered and Edgar Thomson is full till July. A number of good rail contracts are pending. On track material we quote as follows: Iron track bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.20c.

SPELTER.—Small sales of spelter are reported. Quotations are 3.85c to 3.95c.

PIPES AND TUBES.—A peculiarity of the orders being turned out by pipe mills is the small proportion of large sizes called for. The total tonnage keeps up well, and January was a particularly heavy winter month. No award has yet been made of the 100 mile order for Indiana gas fields. Old base discounts are quoted as follows: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld galvanized, 50 per cent off; lap weld galvanized, 55 per cent off. The additional discounts are 6 tens on small lots and 6 tens and 5 per cent on attractive orders. Boiler tubes are in very active demand. Discounts on merchant boiler tubes are as follows: 2¼ inch and smaller, 72½ per cent off; 2½-inch and larger, 75 per cent off.

BARS.—There is still an absence of strength in steel bars and mills are quoting 95c. The attempts to organize Western mills are of little interest locally, as Pittsburg iron is almost all branded and each make is a law to itself. Valley mills quote common iron at 1c.

IRON AND STEEL SKELP.—The week was active in skelp—particularly in steel skelp and both Wheeling and Pittsburg mills were interested. Some low prices were made, grooved steel skelp selling as low as 85c, Wheeling district mills, under sharp competition. Quotations are made as follows: Grooved steel skelp, 90c to 95c; sheared steel skelp, 1c to 1.07½c; grooved iron skelp, 1.05c to 1.10c; sheared iron skelp, 1.12½c to 1.15c.

SHEETS.—A variation is noticeable in the quotations of sheet mills. Some, not covered on sheet bars through the second quarter, are asking 2.05c since the advance in steel, while second quarter deliveries can still be had from other mills at 2c for No. 28. That price, however, is the market minimum. Galvanized sheets are weak and quoted at 80 and 7½ per cent off list. Black plates for tinning are selling at $2.20.

OLD MATERIAL.—Scrap has not felt the jump in Bessemer iron and the sympathetic rise in steel. No. 1 wrought is quoted at $11.75 net; cast scrap at $9.25; old steel rails, $10.50; old iron rails, $14; car wheels, $10 net; wrought turnings, net, $7.

CINCINNATI.

February 16.

There has been considerable talk during the past week regarding the meeting of the iron masters in Birmingham. The meeting, however, adjourned to meet again Feb. 16, so at the present writing nothing definite has been accomplished, although it seems to be an assured fact that the Southern producers intend to work together harmoniously and to maintain prices on the schedule basis. Quite a little business in a retail way is being done, and while there is no phenomenal demand, yet that which does exist is satisfactory. The largest consumers seem to be waiting to ascertain whether fresh anxiety will be evinced on the part of Southern producers to load up with orders at less than current quotations. Most of the furnaces are willing to let business pass unless they can obtain for No. 2 foundry $7.25, Birmingham basis, but buyers claim that there are still a few making iron of a satisfactory quality who continue to shade this price. We quote for cash f. o. b. Cincinnati: Southern coke, No. 1 foundry, $9.75; No. 2, $9.50; No. 3, $9.25; gray forge, $8.75; mottled, $8.75; No. 1 soft, $9.75 to $10; No. 2, $9.50 to $9.75; Belfont coke, No. 1, Lake Superior, $11 to 11.50; Belfont coke, No. 2, Lake Superior, $10.50 to $10.75; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1, $12.50 to $13; Standard Georgia car wheel, $14.25 to $15. The demand for finished iron is very good, and bar iron is a trifle firmer. Wire and wire nails are firmer and an upward tendency is noticed. Owing to the advancing price of rods, the Cincinnati Barbed Wire Co., which is one of the largest consumers in this part of the country, is considering the erection of its own plant to operate in connection with its present establishment.

PHILADELPHIA.

February 15.

The increase in pig iron production is a partial offset to the hopeful predictions concerning volume of business and prices. The fact that no material increase can be made in production without a distinct advance in prices, that will permit plants now barred out to become active again, is cited as against any apprehension that prices will suffer from over-production. The season of the year is close at hand when demand is quickened, and there is confidence that within two months a movement will be seen that will give full employment to all departments of the trade. Buyers of pig iron still report offers below current quotations, but in general there is not the extremely weak feeling noted ten days ago. The Pittsburg movement in Bessemer has had at least a sentimental effect upon the situation. We quote No. 1X foundry at $11.75 to $12; No. 2X at $10.75 to $11.25; No. 2 plain at $10.50; mill iron at $9.75 for ordinary to $10.25 for standard; basic iron at $10.40 to $10.50. The situation is firmer in steel. Prices on later deliveries are in doubt. Prompt billets are quoted $17.25 to $17.50, with most sellers firm at the latter figure, but little actually done. The plate and structural mills are well occupied for the seocnd month of the year, and are not showing any disposition to cut the market. In bars and sheets the situation is not so firm and considerably more business will be required to put manufacturers in a position to advance prices. Bars are not in as good shape as the general situation would indicate. Quotations on common bars are 1.05c to 1.10c; on refined bars, 1.15c; steel bars, 1.10c to 1.20c; plates and angles, 1.15c to 1.20c; beams and channels, up to 15 inches, 1.30c.

THE plant of the Inland Iron & Forge Co., of East Chicago, Ind., was closed down for a short time last week, because of a strike of the heaters' helpers. It was settled within 24 hours, and the plant is now running full again.

THE IRON TRADE REVIEW

DEVOTED TO IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES.

PUBLISHED EVERY THURSDAY BY
THE IRON TRADE REVIEW CO.,
CLEVELAND, OHIO.

CLEVELAND, 27 VINCENT STREET.
G. H. GARDNER, President. A. I. FINDLEY, Editor.

CHICAGO:
1142 MONADNOCK BLOCK.
B. M. GARDNER, Associate Editor and Western Manager.

PITTSBURG:
807 TRADESMEN'S BUILDING.
JAMES R. MILLS, JR., Manager.

Subscription (strictly in advance), $3 per annum. Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW, through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

FEBRUARY 17, 1898.

OUR CONSUMPTION OF IRON.

The rate of pig iron consumption, as compared with production, is a matter of constant interest and study. For reasons with which the iron trade is familiar, it is impossible to do more than approximate the amount of iron taken up by the country in any given period. Stocks carried at steel works, rolling mills and foundries may be considerably larger at one time than another, and this item is always an unknown one. The amount of sold iron in furnace yards is a fluctuating quantity. But approximations are made, based on reports of stocks, with allowance for exports and imports. A computation of this sort for 1897 is reproduced elsewhere from the current issue of the *Bulletin*, in which the approximate consumption for 1897 is put at 9,383,388 tons, or 245,000 tons less than that of the boom year 1895 and not greatly above that of 1892.

It is needless to say that the consumption to-day is considerably in excess of the above rate. If the same method of computation be followed for the second half of 1897—though the start in iron and steel was not apparent until about mid-August—it will appear that the rate of consumption represents more than 1,000,000 tons a year in excess of that for the whole year. Stocks on hand June 30 were 973,678 tons; production in the second half was 5,249,204 tons, and imports were about 10,500 tons. The total supply is thus 6,233,382 tons. Deducting stocks of Dec. 31—874,978 tons—and exports for the second half—about 140,000 tons—leaves 5,218,404 tons as apparent consumption, equivalent to a yearly rate of 10,436,808 tons.

While nothing can be told definitely concerning steel works stocks of pig iron, which are not included in the above, it can be said in general that they were very low at the end of 1897, as compared with the middle point of the year. The recent purchases at Pittsburg, for prompt delivery, are something of an index in one case, where a stock of 50,000 to 75,000 tons of metal would not be excessive in ordinary times. Another large steel company might be named, whose yards are bare of iron and have been for some weeks, though two or three more furnaces are active than were in blast at any time in 1897.

Another point to be considered in comparing statistics of current consumption with those of other years relates to exports. True, if the aim is to find out just how much iron is being consumed in the United States, exports should be deducted from production. But if these statistics are to give an idea of the amount of iron from the furnaces of this country that is being absorbed, and to furnish a gauge of the American furnace capacity that can be kept active, there will be no subtraction of the export tonnage. If pig iron exports be not included, then there must be a subtraction also, of the large tonnage of finished material and machinery that has gone abroad in the past year or two. We know that this has been far beyond that of preceding years, and that if proper allowance were made for it, the real home consumption of iron and steel in 1896 and 1897 would be considerably below what, on the face of the figures, we have been assuming. The point to be arrived at is what output of material from the steel works, rolling mills and foundries of the United States can be sustained by the market—the home market and those markets abroad into which we are pushing with such gratifying success—without causing such an engorgement as shall demoralize prices. For three months now we have sent more iron and steel to market than in any like period in our history, yet without producing any advance in prices, with an exception here and there. On the other hand, the prodigious runs of the mills and furnaces have not caused a glut of any form of material. The foreign demand, it would seem, has been the regulator; and its function, doubtless, will continue to be that of a regulator, preserving the home trade from those sharp and unhealthy fluctuations that have been so much of an unsettling element in other years.

THE INTERNATIONAL STRUGGLE FOR TRADE.

A contemporary, in urging in a recent article that every hindrance to the extension of the American export trade in machinery be removed, contends that as American skilled labor is the most efficient labor in the world, and since materials out of which machinery is made are bought in this country at lower prices than those available to machinery builders in other countries, the actual effect of a protective tariff on machinery is to belie these claims, aggravate foreign machinery builders and assist them in their efforts to get retaliatory tariffs. It urges that if machinery is to be exported we must accept goods in return for it and must have less to say about the products of "foreign pauper labor."

As a matter of fact much less is heard nowadays than was current a few years ago, about foreign pauper labor. The cost per unit of output is the test of cheapness, and the evolution of mechanism, which is the most familiar factor in the industrial revolution in the United States, has turned the tables against the old world, in this regard. Moreover, wages in certain employments in European countries have been advancing all the time that

American invention has been doing its utmost to reduce the handicap of high-priced labor here. In Germany, for example, wages in iron and steel production are higher to-day than those of five years ago. In England, trade unionism has imposed oppressive and unreasonable restrictions which have wiped out much of the seeming advantage of lower wage schedules.

But speaking generally, it is scarcely wise to trim the tariff policy of the United States to the fancy of those who on the first gathering of the fruits of protection that hang on the outer wall are quick to advise that the structure on which we have climbed shalll be torn down. The present is a time of rapid changes in industry and trade. The whole world is on a strain for commercial and industrial advantage. The sudden leap of the United States into prominence in the world's arena of trade has aroused the interest and the opposition of all Europe. German and other foreign manufacturers are naturally resentful of American intrusion in their market. But it is not our protective tariff that excites them. It is the fact that our manufacturers are getting some of their business — are making better and cheaper machinery. German traiffs are not a new thing, framed to check the growth of American trade in that country. They were made long before American machinery was seriously regarded as a factor in competition there. Germany and France had the tariff system of the United States as a model when they began casting about for means of resisting England's commercial aggressions. And English manufacturers and statesmen have admitted on more than one occasion that England's great danger to-day is in her lack of the weapons which other nations have used so effectively in their battles for trade supremacy. The following from the last issue of the London *Iron and Coal Trades Review* is one of many expressions at variance with England's traditional policy:

A correspondent calls my attention to the fact that the makers of wire rods and steel billets in this country are being prejudiced by our increasing imports of these articles. He points out that "pools and syndicates are in existence in almost all departments of the export trade in Germany, and the same system is rampant in America—mainly in regard to the British foreign trade in hoops and wire to India and the Colonies; while the 'dumping' of surplus steel billets and wire rods in our home markets is assuming alarming proportions. Practically all the wire drawers who do not roll their own rods are keeping themselves supplied with the main part of their requirements from American sources, and even some of those who do roll rods find it cheaper to stop their wire mills and buy American material." All this is very unsatisfactory, but it is difficult to see how it is to be prevented. I can only think of one practical remedy—that of placing a duty on imports of foreign manufactures, and that, of course, would be objected to, both by free traders, as such, and by those who find it cheaper to purchase billets and rods of foreign origin.

In a day when "favored nation" treaties are more and more the rule, and in which new factors are constantly coming into prominence in the international struggle for trade, it is certainly not the part of wisdom for the United States to throw away all its bartering capital. If reciprocal trade arrangements are to be made, there must be something to give in return for concessions. It would be folly to put ourselves in England's position at a time when her weakness is most apparent to the world and most deplored at home.

PERSONAL.

Ernst Prochaska, M. E., of Pittsburg, sailed for Europe last week in the interest of the Uehling method of casting and conveying metals. He will meet James W. Miller, special agent for the Uehling machine, in London. A number of furnace companies in England and Scotland are considering the introduction of the Uehling system.

Robert S. Williamson, Cornelius Marshall, W. E. Harrison and J. Davis, all connected with the John Russell Co., Ltd., owning the Alma Tube Works, at Walsall, Eng., are in this country on a tour of inspection. Pittsburg plants are now being visited and the valleys, Cleveland and Chicago will be taken in later.

Archer Brown, of New York, resident partner in Rogers, Brown & Co., has returned from a tour of several months in England and on the Continent. Mr. Brown's trip was with a view to the further extension of exports of Southern iron for use in European foundries.

Horace V. Winchell, of Minneapolis, has gone to Colorado to examine some properties in the La Plata mountains.

Wm. M. Brewer, mining engineer, who has devoted himself largely to the study and exploration of the minerals of Alabama and other Southern States, has gone to British Columbia to investigate some mining propositions.

Edward Leeds, of the Brown Hoisting & Conveying Machine Co., Cleveland, and Axel Sahlin, formerly of Sparrow's Point, and now connected with the Brown company, have sailed for Europe in the interest of that company. Quite a number of foreign orders have been executed at the Brown works recently, including some work for the Krupp plant, and more is in prospect.

W. H. Bosworth, heretofore located in the Perry-Payne Bldg., Cleveland, has become associated with the W. M. Pattison Supply Co., 277-287 St. Clair st., Cleveland, and will give special attention to the engine, boiler and machinery departments of the concern. The other lines of this company are heavy hardware, railway and mill supplies, oils, pipe, fittings, valves, etc.

Superintendent Matthias, of the South Chicago plant of the Illinois Steel Co., says in regard to the report that employes were being forced to work on Sundays: "We are not working Sundays and have not asked our men to do so. A few weeks ago, owing to the crush of orders, we increased our working force and added one night a week to the schedule, making six days and six nights. At the start we made 5 o'clock on Saturday night the closing hour and 6 o'clock Sunday night the beginning time, but at the request of the men we changed this so that we close at 10 P. M. on Saturdays and begin again at midnight on Sundays."

At a meeting last week of the stockholders of the American Ax & Tool Co., objection was made by a minority of the stockholders to the plan of concentrating all the plants of the company near Charleroi, Pa. As a result, the matter is unsettled and may be deferred.

Several shipments of chilled rolls have been made to England recently from the foundry of the Apollo Iron & Steel Co., at Apollo, Pa., and further orders are booked.

The improvements and additions planned by the American Steel Casting Co. for its plant at Sharon, Pa., will practically double its output.

The sheet mills of the Reeves Iron Co., Canal Dover, O., have been shut down the past week, pending a settlement of differences that have arisen over the wage scale.

In connection with the repairs to be made to the Stewart Iron Co.'s furnace, at Sharon, Pa., a new blowing engine will be installed.

IMPROVED PLAYFORD STOKER.

The boiler furnace construction, with traveling grate and other features, brought out by the Playford Stoker Co., has been described in previous issues of this paper. In the illustrations presented in this connection are shown the essential features of recent improvements which have added considerably to the efficiency of the apparatus. The stoker consists, in brief, of an endless chain grate, supported upon a carriage mounted upon wheels, standing upon iron rails, easily removable from underneath the boiler. The grate consists of chains, wrought iron T irons and small grate bar sections. The wrought iron T irons correspond to and are substitutes for the webs of ordinary furnace bars. They are fastened to opposite links of the chains; over them slide the small sectional bars. This construction stands not only the ordinary wear and tear of the boiler room, but also the abuse that a device of this kind is liable to receive at the hands of firemen. The

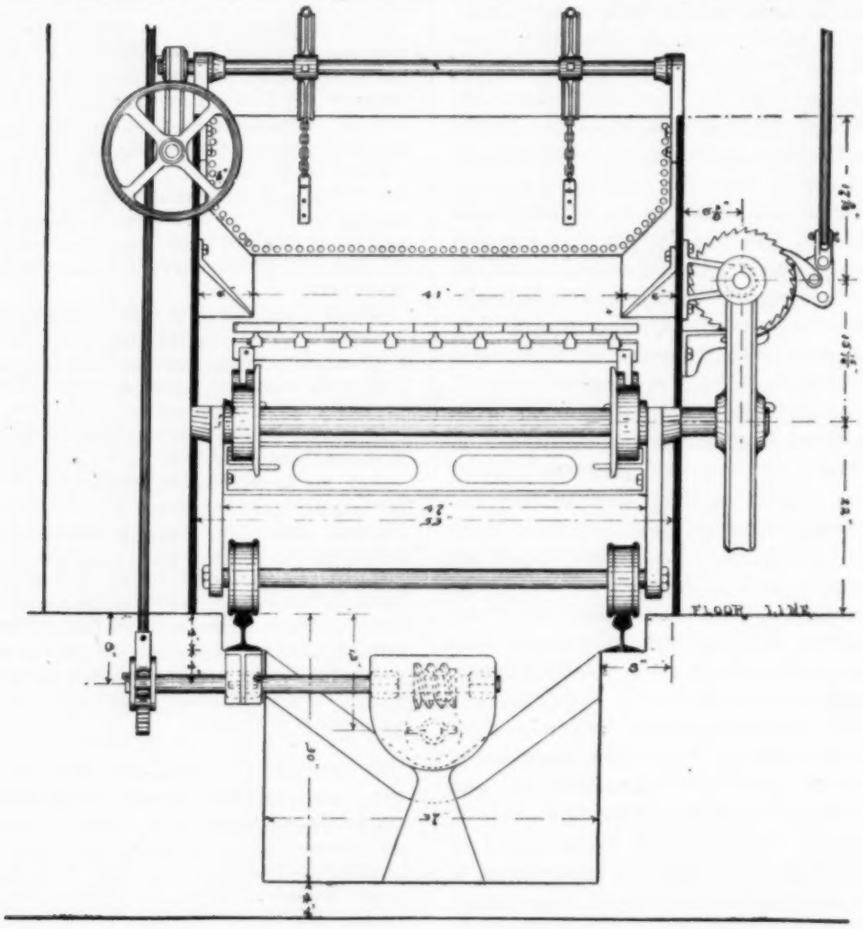


FIG. 1.—PLAYFORD STOKER, FRONT ELEVATION.

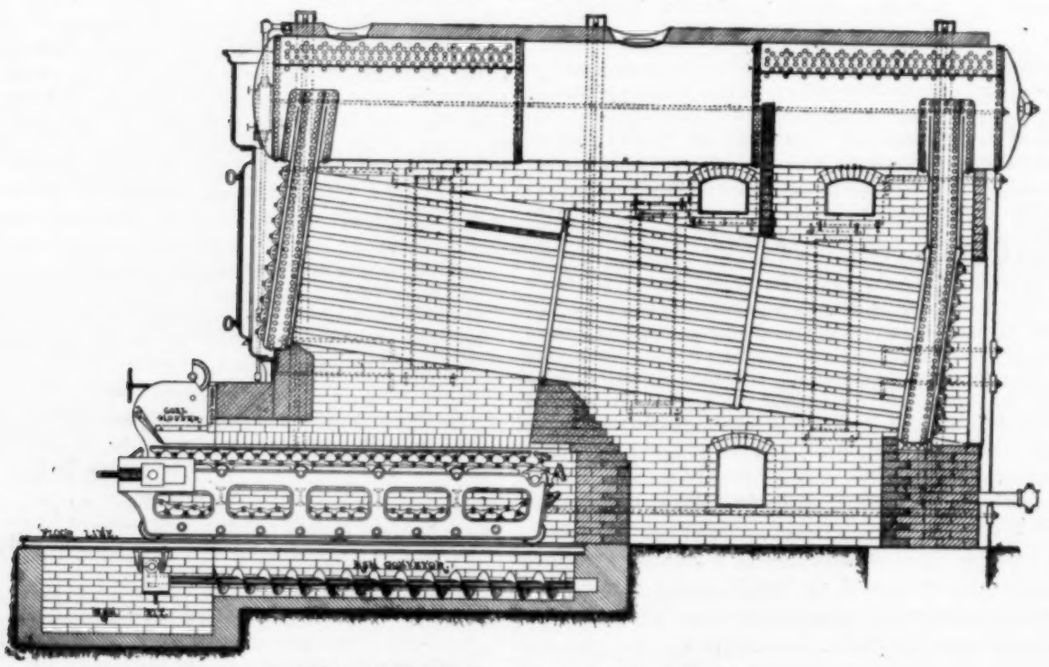


FIG. 2.—PLAYFORD STOKER, LONGITUDINAL SECTION.

stoker is provided with a water front which prevents the coal in the hopper from igniting. An ash conveyor is also provided that delivers the ashes that fall over the rear of the grate at a point in front of the boiler. Usually in furnaces of this class the ashes are deposited from the rear end of the grate surface into the rear portion of the ash pit, whence their removal by hand with rakes or shovels is difficult. In the improved Playford apparatus the ashes are removed as fast as they are deposited, and thus any accumulation in the pit is prevented. Spiral conveyors are arranged as shown, in the bottom of slanting-sided pits, in operative connection with the mechanism which operates the traveling grate.

The front elevation of a furnace below the bottom line of the boiler, Fig. 1, shows the traveling grate and the ash-pit with conveyers, together with the mechanism for operating them. The grate-carriage and the ash-pit are shown in longitudinal section in Fig. 2. In Fig. 3 the construction of the

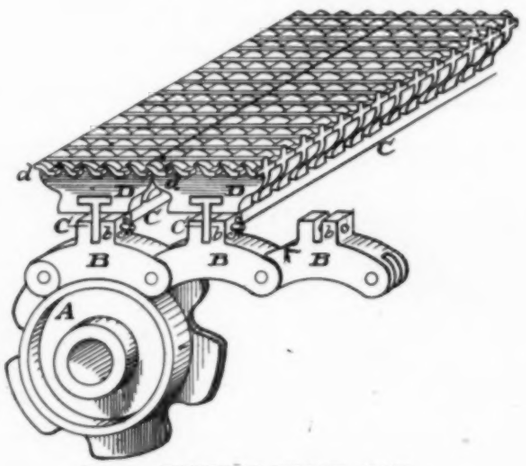


FIG. 3.—PORTION OF FURNACE GRATE.

grate is shown. B, B, are links of the chains of the traveling grate, and are carried on the sprocket-wheel A. The links have on their upper curved side slotted lugs *b*. One end of each link is made with a single eye and the opposite end with a double eye, so that when they are joined together there will be an even strain on the bolts that unite them. C, C are T-iron bars supported at their ends in the lugs *b*, held in place by bolts with cotter-pins *c*. The grate surface sections D are made in blocks with their under part shortened and thickened, and having a transverse T-shaped mortise, so that they can be slipped on to the T-iron bars. The webs of the sections stand transversely with the T-iron bars so that the ends of the webs on each bar abutting form continuous ribs lengthwise of the fire-surface. On the sides of the webs of the sections are transverse fingers *d*, *d*, projecting oppositely, so that when the sections are assembled on the T-irons the ends of the fingers come in contact and form continuous ribs crosswise of the grate.

The advantages of this stoker are not only the abatement of smoke, economy in the use of fuel and increased capacity of boiler attended with increased efficiency, but the successful burning of bituminous coal screenings. The cost of repairs, it is demonstrated, is not greater than for repairs to a hand-fired furnace.

Illustrating the performance of the improved stoker, we append the report of Chief Engineer W. Kiersted to Col. D. W. Longwell, superintendent of the water department, Kansas City, Mo., on a test of the west boiler of the battery of two water tube boilers, erected by the National Water Tube Boiler Co., of Brunswick, N. J., equipped with the Playford stoker. A memorandum is given also of results of a preliminary trial of the east water tube boiler, made a few days previous:

	OFFICIAL TEST.	PRELIMINARY TEST.
Date of trial	January 19th, 1898.	January 13th, 1898.
Duration of trial	Eight hours.	Five hours.
DIMENSIONS AND PROPORTIONS.		
Grate surface....wide....long, area	67 square ft.	67 square feet.
Water heating surface builders rating	3024 "	3024 "
Ratio of water heating surface to grate surface	45	45
AVERAGE PRESSURES.		
Steam pressure in boiler by gauge	80.2 degrees F.	147 lbs.
Forces of draught in inches of water	0.532 "	0.643 lbs.
AVERAGE TEMPERATURE.		
Of external air	36.3 degrees F.	45 degrees F.
Of escaping gases	401 "	467 "
Of feed water	39 "	37 "
FUEL.		
Cherokee Slack mined in the state of Kansas		Same.
Total amount of coal consumed	13,294 lbs.	6,982 lbs.
Moisture in coal	3% per cent.	
Dry coal consumed	12,829 lbs.	
Total refuse, dry, 1,919 lbs.	14.43 per cent.	
Total combustible	10,910	
Moist coal consumed per hour	1,662 lbs.	
Dry coal consumed per hour	1,605 lbs.	
Combustible consumed per hour	1,363 lbs.	
WATER.		
Total weight of water pumped into boiler and evaporated	91,962 lbs.	48,259 lbs.
Equivalent water evaporated into steam at 80.2 pounds pressure from feed water at 100° F.	97,020 lbs.	50,865 lbs.
Equivalent water evaporated from and at 212° F.	111,770 lbs.	59,291 lbs.
Equivalent water evaporated per hour from feed water at temperature of 100° F.	12,127 lbs.	10,173 lbs.
Water actually evaporated per hour into steam from temperature of feed 39° F.	11,445 lbs.	
Equivalent water evaporated into steam from and at 212° F. per hour	13,971 lbs.	11,858 lbs.
Water actually evaporated per pound of moist coal from actual temperature and pressure	6.92 lbs.	6.91 lbs.
Evaporation as in 25 with dry coal	7.17 lbs.	
Equivalent water evaporated per pound of moist coal from actual pressure and temperature of feed at 100° F.	7.3 lbs.	7.3 lbs.
Equivalent eqaporation as in 27, but with dry coal	7.56 lbs.	
Equivalent water evaporation per pound of moist coal from and at 212° F	8.41 lbs.	8.5 lbs.
Equivalent water evaporated per pound of dry coal from and at 212° F	8.71 lbs.	
Equivalent water evaporated from and at 212° per pound combustible	10.25 lbs.	
EQUIVALENTS AT 150 LBS. STEAM PRESSURE.		
Equivalent water evaporated from temperature of feed water of 100° Fahr	96,050 lbs.	
Equivalent water evaporated per hour from temperature of 100° F.	12,006 lbs.	
Equivalent water evaporated per pound of moist coal	7.23 lbs.	
Equivalent water evaporated per pound of dry coal	7.49 lbs.	
RATE OF COMBUSTION AND EVAPORATION.		
Coal actually burned per square foot of grate surface per hour	24.8 lbs.	
Water evaporated per hour from and at 212° F. per square foot of heating surface	4 lbs.	
Commercial horse power	405	343-7
Per cent. above rating	35 per cent.	
Efficiency of boiler	74 "	75 per cent.
Efficiency exceeds the contract requirement by	14 "	15 "
Rate of evaporation per hour exceeds the contract requirement for average work of boiler	33.4 "	13 "

At the beginning of the trial the boiler was clean. The feed water was taken direct from the water supply main. Both water and coal were carefully weighed. During the trial some smoke escaped from the stack, but it was never opaque and was attributable to the fact that the boiler was being continuously forced beyond a normal rate of combustion and evaporation. When working under normal conditions during the preliminary test, no smoke was noticeable.

MR. WILLIAM METCALF, of Pittsburg, president of the Braeburn Steel Co., addressed the St. Peter's Club, connected with the St. Peter's Protestant Episcopal Church, of Pittsburg, last Monday evening on "Carbon and Iron, Their Properties, Relations and Uses." The talk was informal and technical questions were avoided as far as possible. In speaking of carbon, Mr. Metcalf referred to its occurrence and uses. "The wealth of this region," he said, "in the occurrence of this element, is many times greater than the wealth of the Klondike, and I can only advise our young men to stay at home and develop the great coal fields, which are greater than all others in the world." The conversion of iron into steel and the part that carbon plays in the process were also taken up. He maintained that the use of steel is universal and could not be eliminated. "The clothes you wear are cut and sewed by steel; your timepiece runs by the agency of steel; you travel over steel rails on steel wheels and steel springs for your comfort."

THE American Pig Iron Storage Warrant Co. had 282,500 tons of iron in yards Feb. 10, the record of the previous 10 days showing 4,600 tons put in yard and 4,200 tons withdrawn.

AGAINST THE CAST IRON PIPE "TRUST."

The United States Circuit Court of Appeals for the Sixth Circuit decided the "cast iron pipe trust" case at Cincinnati, Feb. 14, against the pipe companies. Mr. Justice Harlan and Circuit Judges Taft and Burton composed the court. The suit was begun in the United States Circuit Court at Chattanooga by bill in equity filed by the Attorney General of the United States against six cast iron pipe companies, the Addyston Pipe & Steel Co., of Cincinnati; Dennis Long & Co., of Louisville; Chattanooga Foundry & Pipe Works, of Chattanooga; the South Pittsburg Pipe Works, of South Pittsburg, Tenn.; the Anniston Pipe & Foundry Co., of Anniston, Ala., and the Howard-Harrison Iron Co., Bessemer, Ala., to enjoin them from continuing to do business under a contract of association, which, the bill charged, was a violation of the Federal anti-trust act of 1890, because it was in restraint of inter-State trade in cast iron pipe and an attempted monopoly of the same. The Circuit Court dismissed the bill and the United States appealed. The decision just rendered reverses the Circuit Court.

The organization of the companies named into what has been known in the cast iron pipe trade as the "Southern Confederacy," is a matter of familiar history in iron circles By the contract the defendants divided the country into "free" and "pay" territory. Free territory embraced New York, Pennsylvania and Virginia and all States north and east of them. Pay territory embraced the rest of the United States. In free territory the associates were permitted to sell pipe at any price they saw fit. All orders received from pay territory had to be submitted to a central board, which fixed the price and then assigned the job to the one of the associates which would agree to pay the others the highest bonus. Certain large cities were reserved to particular members, and on orders received from them the price and bonus were fixed by the board. Though the aggregate tonnage capacity of the associates was only 30 per cent of the total tonnage capacity of all the mills in the country, it was over 60 per cent of the tonnage capacity of competing mills in pay territory. By the custom of the trade all contracts were made to include delivery by the seller at the home of the buyer.

The Court of Appeals held, first, that the contract of association, even if the prices fixed under it were reasonable, and its only purpose was to prevent ruinous competition, as claimed by defendants, was nevertheless void at common law, because in restraint of trade and attempted monopoly; third, that the trade restrained by the contract of association was the negotiation and sale of pipe to be delivered across State lines from the State of manufacture to the State of sale, and that this was, under all the decisions of the Supreme Court, inter-State commerce; and, fourth, as a conclusion from these premises that the contract of association was a restraint and burden on inter-State commerce and a violation of the Federal anti-trust act, and should be enjoined. The court distinguished this case from the sugar trust case on the ground that the contract sought to be enjoined under the Federal anti-trust act in that case was a contract of association for the manufacture of sugar, and did not involve, as the contract in this case did, the restraint of sales of merchandise to be delivered across State lines.

The judgment of the Circuit Court of Appeals reversed the decree of the Circuit Court and instructed that court to enter a decree enjoining the six defendants from continuing to do business under contract of association or from in any way maintaining the same.

Indictments are pending against the members of the association in the Federal Court at Chattanooga. When the original decision was given in the civil action, that the association did not violate the Sherman anti-trust act, because there were other plants of large capacity in the territory covered by the association, District Attorney Bible, of Chattanooga, began criminal proceedings, which are still pending.

As illustrative of the association's method of operating in "pay" territory, the recent pipe letting in Cleveland may be cited. The Addyston Pipe & Steel Co. was the only member of the association that bid. The Lake Shore Foundry Co., of Cleveland, which has had the contract heretofore, bid $17.45 a ton delivered on streets. The Addyston company's bid was $16.73. There was an effort to have the award made to the Cleveland company on the ground that employment would be given thereby to local labor, but the city council at its meeting Monday night, awarded the contract, which calls for 6,340 tons, to the Addyston company.

THE TIN PLATE MARKET.

The past week has been an active one and a number of large inquiries are still upon the market. Buyers are finding difficulty in getting plates for deliveries before July 1 and this condition has made the market firmer though there is no quotable advance. Some buying over the last half of the year has been done, as buyers are taking advantage of the present low prices and are covering their requirements against a posible advance which would come if a combination should be formed. The range of quotations is considerable, especially for late deliveries. We quote as average of market f. o. b. Pittsburg, or Indiana districts:

CHARCOAL TINS.

	IC	IX
Lisvane Grade,	$3.45	$4.20
Calland Grade,	3.65	4.35

COKE TINS.

IC, 108 lb.	Basis weight,	$2.95
100 lb.	" "	2.80
95 lb.	" "	2.70
90 lb.	" "	2.75
85 lb.	" "	2.60
80 lb.	" "	2.60

TERNE PLATES.

IC, 216 lb.,	20 x 29	$5.85
200 lb.	"	5.55

Five cents reduction is made from the above for deliveries beyond July 1.

There is no new development in connection with the combination scheme. The report was current in the latter part of last week that negotiations had been suspended on account of failure to secure the co-operation of a large New York firm interested in Shenango valley steel and tin plate plants. It is now stated authoritatively that this firm has not decided to hold aloof. Its interest in the Shenango valley plants is not a majority one and the companies operating these plants have not take action on the matter. The attitude of the New York firm, however, is in line with the stand taken by other selling interests there, so that the chances as the project now stands, are rather against its consummation.

The proposition made by the manufacturers' committee, which looks to the taking of a one-third interest in the new combination, by the large New York dealers, is not now expected to become the final basis of the consolidation, should it go through. It is felt by the selling interests that the great drawback to a combination is the widely differing ability of various plants to compete under the conditions of the trade to-day. To carry out the plan proposed it will be necessary to take in plants whose locations will probably require that they be shut down and thus become a drag upon the newer companies. It is said that this will have to be carried on to such an extent that no matter how rigid may be the economies introduced, new concerns with modern plants and favorable locations will have ample inducement to start up at any price at which the combination may be able to operate at a profit, carrying so much dead plant. The troubles in the tin plate trade, it is further argued, are not entirely low prices. Even present prices, it is claimed, do not imply a loss to mills that have good locations and are properly equipped. On the other hand, present prices may mean a direct loss to mills that are not operated under such favorable conditions. One element in the present competition is the failure of new companies to make due allowance for deterioration. Thus a seeming low cost is figured that must be compensated for later on in heroic charging off.

THE old Kensington Iron Works, of H. Lloyd's Sons Co., Pittsburg, now being dismantled, were built in 1828, and contain 20 single puddling and scrapping furnaces, with bar, 8-inch, 15-inch and 20-inch mills. The product was bars, flat rails and 12 to 30-lb. T rails. For three years no attempt has been made to operate the plant owing to the small demand for bar iron.

IMPROVEMENTS AT A PITTSBURG PLANT.

The Clinton Iron & Steel Co., Pittsburg, awarded contracts during the week for two 5,000,000 gallon pumps which are to be a part of a complete water works system that will be installed at once and which will be adequate to supply all the demands of the plant. The location of the Clinton Furnace adjacent to the Monongahela River is clearly shown in the recent photograph reproduced herewith. Two intakes 20 inches in diameter will convey the river water underneath the stock yard and plant to two wells 37 feet deep and 25 feet in diameter. The two 5,000,000-gallon pumps will force the water thence to a steel standpipe that is to be erected above the furnace on the hill side. The standpipe will be 80 feet high and 20 feet in diameter.

Before blowing in last August the Clinton Furnace was relined and completely overhauled. The substitution of 16 tuyeres for the seven formerly used has been fully justified by greater uniformity in the foundry irons which are the company's specialty, and the output has been increased by at least 80 tons a day. On a recent cast 267 tons were made. This increase is also attributable to greater blowing power since the installation of another Cuyahoga blowing engine, 42x84, built by the Cleveland Shipbuilding Co. A similar engine was purchased two years ago, which, with the one just added and one of an older type, gives ample blowing equipment. The furnace is provided with three 18x60 Foote hot blast stoves.

Another recent addition is a complete electric lighting system that supplies both arc and incandescent lights to the furnace, cast house, stock yard and rolling mill and also to the Clintons Iron & Steel Co.'s kindred interest, the Union Foundry & Machine Co. The 25 k. w. Westinghouse dynamo is directly attached to a Skinner automatic engine. Ten arc and 200 incandescent lights are supplied.

In the near future it is planned to improve the shipping facilities by a system of over head traveling cranes operated by compressed air. The company's own tracks connect direct with the Pittsburg & Lake Erie Ry., which runs through the property and by the system which has been planned finished material can be transferred by cranes from the mills to the cars without handling. Air cranes will be added to all departments of the plant.

The entire plant is now in operation, the furnace on Bessemer iron and the rolling mill on basic open-hearth truck plates for use on steel cars.

THE Wilkes Rolling Mill, at Sharon, Pa., whose product is muck bar exclusively, started last week after a long idleness.

SALEM IRON CO.'S FURNACE REBUILT.

The work of reconstruction which has been in progress at the Seneca Furnace of the Salem Iron Co., at Leetonia, O., was completed last week and the furnace blew in on Bessemer iron. The recent changes are but a continuation of the complete overhauling commenced three years ago, as a result of which the Seneca Furnace plant is now practically new.

The furnace proper was rebuilt in 1894, the stack being enlarged to 76x17 feet from 54x15. A new cast house was also built. Four 250-h. p. boilers and a Cuyahoga blowing engine 42x84 in. were added in 1896 and two 24 in. duplex Wilson, Snyder & Co. pumps were installed later. The additions just completed were begun last year. The entire arrangement of the stock and ore yards has been changed and a system of bins has been added. Three new stoves have just been completed and the stack itself has been relined and the number of tuyeres increased to 16. The stock yard for coke, ore and limestone has been very much enlarged and it is estimated that a three months' ore supply can be accommodated in the yard. The coke storage is also large. The yard is spanned by tracks 300 feet long and elevated 18 feet. Every part of this stock yard can be reached at the furnace level by carts.

PLANT OF THE CLINTON IRON & STEEL CO., PITTSBURG.

One of the elevated tracks runs into the stock house and from it coke, ore and limestone are unloaded directly into the bins. The latter are built of heavy oak timbers and each of the three vents at the bottom of a bin is covered by at hree-eighths inch plate which after stock has been drawn, falls of its own weight into a groove. The hoist is vertical and a Crane hoisting engine is used. Scales are located at the foot of the hoist.

In addition to the increased number of tuyeres, a new feature of stack construction is a dust catcher of unique design. The gases from the down-comer enter the dust catcher from below and pass upward through a sheet of water. A water seal closes the chamber at the bottom. The water discharged from the dust catcher passes through a number of small reservoirs in its journey from the stack. In each of these is deposited ore dust carried from the cleaning process. After passing through a number of such receptacles, the water is collected almost entirely pure in a reservoir 20 feet deep and 20 feet in diameter and thence is drawn to be used again.

The three stoves just added are of the Kennedy-Cowper type, 20x75 and were erected by the well known Pittsburg firm of engineers and contractors, C. J. Farrar & Co. The general superintendency of the work has been in the hands of Julian Kennedy, of Pittsburg. McKeefrey & Co., of Leetonia, are selling agents for the product of the furnace—Bessemer iron and the well know foundry brands "Seneca" and "Grafton."

THE BACKUS GAS ENGINE.

The economy of the gas engine has been quite well demonstrated among power users, and this consideration has had much to do with securing for it its present popularity as a prime mover. There are diverse views as to the field of the gas engine, but events show that whatever the individual and theoretical opinions as to its province and possible limitations, its use is rapidly extending and the number of its enthusiastic friends is steadily increasing. The imperfections of some particular types have not prevented prompt recognition of the value of others.

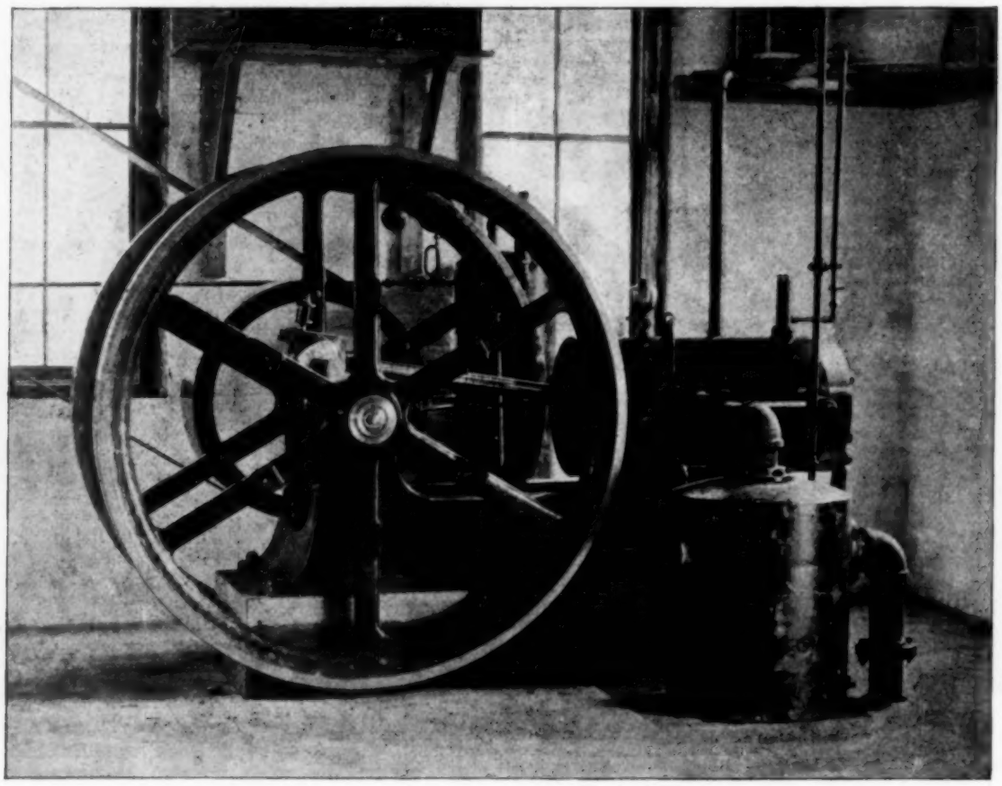
In the Backus gas engine the manufacturers have studied to reduce the number of working parts to a minimum and to secure simplicity of constrution and ease of operation. There is a wide range in the sizes built and in the service performed. The one-half h. p. engine, for example, weighs 280 lbs., and between that and the 60 h. p. engine are 18 sizes. The 60 h. p. engine weighs 16,000 lbs., the height over all being 6 feet, while the floor space occupied is 10 ft. x 4 ft. 10 inches.

The governor has a special arrangement which obviates the use of gears or belts, being driven by an eccentric. This gives smooth, easy motion, and dispenses with rotating balls, gears or fast-moving cams. The speed of the engine is changed while it is running, the operator needing only to touch a thumb screw. The ignition tube, which is provided in the case of horizontal engines, does away with slide valves, electric spark or igniters. The starting device for large engines makes it possible for one man to start any size of engine with the same degree of safety and ease possible with a steam engine. A compressed air cock is opened and the engine immediately starts. The device is applicable to all the large engines of the Backus type.

The makers of the Backus gas engine have made a special problem of electric lighting with a view to meeting the objections urged against gas engines in this service. With gas at the price paid in large cities it is said to be possible to produce a 16-candle power light with this engine at one-quarter to one-half cent per hour per light. Tests have been made to determine the average consumption of gas under various conditions. The two-story plant of the Backus Water Motor Co., at Newark, N. J., 60x100 feet, is operated by a Backus engine at an expense of $36 to $42 a month for power. The machinery driven consists of 250 feet of line shaft, a 2,500 lb. elevator, two planers, one shaper, pattern shop, five drill presses, two large radial drills, 15 lathes, one blower, one tapping machine, one key-seater, two emery wheels, two iron cut-off saws, one small dynamo and ventilating fans.

In some of the smaller sizes the engine is made either upright or horizontal, the former being advantageous where little room is available. Only two valves are used on the upright engine.

The Backus Water Motor Co., Newark, N. J., or the Bair & Gazzam Co., Pittsburg, will furnish details concerning these engines and will make estimates on proposed installations.



BACKUS 30 TO 35 H. P. GAS ENGINE, WITH SELF STARTER, AS INSTALLED IN A NEWARK, N. J. PLANT.

Germany's Pig Iron Production Growing.

The German blast furnaces continue to show a steady growth in production. The output of pig iron six years ago was 4,937,481 metric tons; it increased to 6,360,982 tons in 1896, and the figures for 1897, just issued by the Association of German Ironmasters, show a total of 6,889,067 tons, a gain of 8.3 per cent over 1896 and of 39.5 per cent as compared with 1892. The position of the industry in Germany differs from that in England and the United States in the absence of fluctuations from year to year, and the fact that each year has shown a gain over the preceding one. Of the production in 1897, we find 1,126,408 tons (16.4 per cent) classed as foundry iron; 1,619,556 tons (23.5 per cent) forge iron; 577,947 tons (8.4 per cent) Bessemer pig, and 3,565,156 tons (51.7 per cent) Thomas or basic pig. Thus a total of 60.1 per cent of all pig iron made was intended for conversion into steel, and 86 per cent of this was basic iron.—[Engineering and Mining Journal.

THE plant of the Vulcan Iron Works, Milwaukee ave., Clinton st. and Carroll ave., Chicago, was almost entirely destroyed by fire February 5, causing a loss of $75,000 or over. The Vulcan Iron Works manufactured public improvement and contractors' machinery. The value of the building, which was put up in 1861, was $35,000. The loss was $15,000. The value of the contents was $75,000; loss, $60,000. The largest loss was on patterns.

THE steel rail mill of the Bethlehem Iron Co. resumed operations on Monday.

AN ENGLISH ENGINEER'S AMERICAN TRIP.

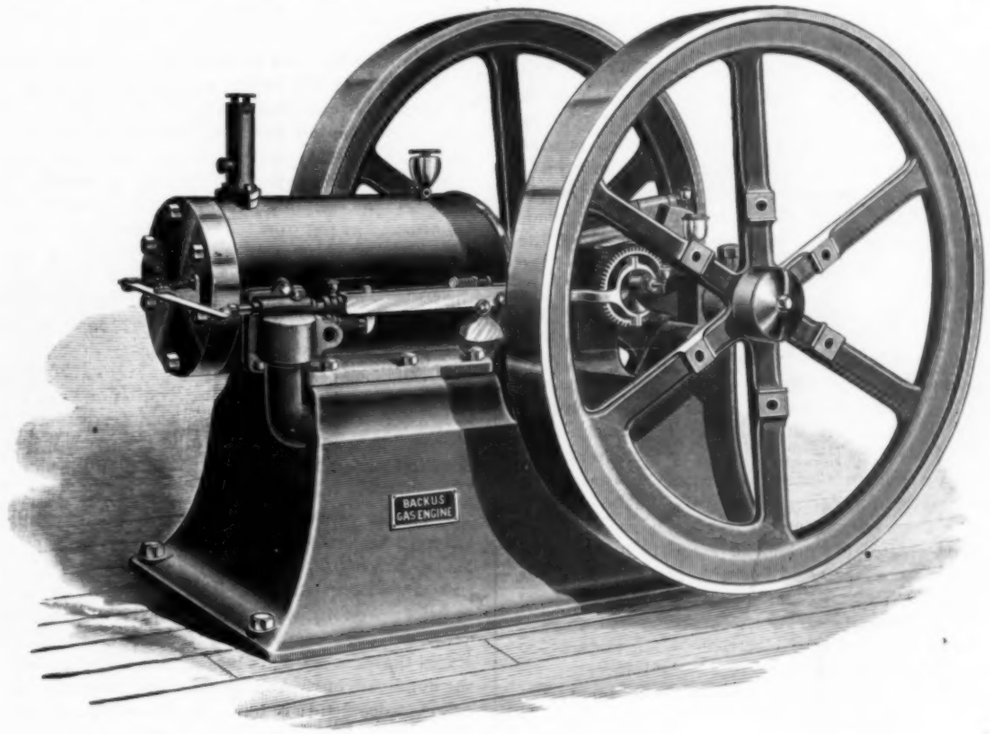
The inaugural address of Henry Webb, as president of the Manchester, Eng., Association of Engineers, delivered at its recent January meeting, is an interesting commentary upon recent progress in the steel and engineering trades of the United States, as noted by the speaker on a trip to this country last year. In the same connection some contrasts between British and American methods are noted. We quote from the address below. The information it contains is not all new to our readers, but the comments will be found of interest:

"In 1890 some members of this association visited America, and they had a unique opportunity of examining its industries, and nothing surprised them more than the American blast furnace practice. Beginning with the accumulated experience of England and Europe, they have gone 'one better,' and they were astonished at the output. In England the pressure of the blast was 4½ lbs., in American 9 lbs. to 10 lbs., and everything in proportion. My object in going to America again was to see if during the past seven years our American friends had stood still, gone back, or advanced. Nos. 1 and 2 of the Duquesne blast furnaces, of the Carnegie Steel Co. have 10 7-in. tuyeres; Nos. 3 and 4, 20 5-in. tuyeres, the pressure of blast at the tuyeres is 15 lbs., but this may be raised to 25 lbs. There are four stoves to each furnace, and 10 engines to four furnaces. The buckets containing ore, coke, or flux are picked up, emptied at the top of the furnace, and returned in 1¾ minutes; only one man attended to this, there being no one at the top of the furnace. Thus there has to be delivered at one spot, 100 ft. above the ground, uninterrupted. ly, a stream of materials per furnace of over 1,200 tons per 24 hours. That is a problem in handling material which only modern engineering can deal with. * * *

"With ores yielding 57 to 60 per cent of metallic iron, the best month's record of these furnaces has been (i. e., each furnace) 17,182 tons, or 572 tons daily, the best week 4,110 tons, and the best day's output 690 tons. Most of the appliances are operated by electricity, and the cost of the plant is enormous, but a very large part of it has been spent in providing appliances for economizing labor, and they say it is well spent; but to me it seemed so serious that none but the boldest and most wealthy would be likely to face it. In England, since 1890, several firms have spent large sums in bringing their plant up to American models, and a few are now working with 9 to 10 lbs. blast. I am sorry I cannot give you the exact details of the best English practice, the owners being reluctant to give the full particulars, but in South Wales, with modern plant, using ore with 48 to 50 per cent of metallic iron, the best output is 1,617 tons per week. In Middlesbrough using Cleveland ore with 27½ to 32 per cent of iron, 800 tons per week. Using rubio ore with 50 per cent of iron, 1,130 tons per week.

"The Duquesne Steel Works are on the same huge scale as the blast furnaces. The billet mill has the largest output in the world. The day I called, the foreman said he expected to roll 1,600 tons; the previous day he had bad luck, having been stopped two hours and engaged on a poor order, two-thirds 2 in. square and one-third 4 in. square, yet in 22 hours he had rolled, cut to length and put into the railway trucks 1,411 tons. The best day's output (24 hours) is 1,800 tons. The Homestead Works cover 430 acres; they are building 16 new open-hearth furnaces, which will make a total of 34, also erecting a new billet and new street rail mill. They employ 5,000 men, but when the new mills are finished they expect this number to be reduced. In September they worked 26 days, and the output was:

	Tons.
Open-hearth department,	30,000
Bessemer,	36,000
Universal mill,	14,000
Plate mill,	8,500
40-inch blooming mill,	12,000
35-inch finishing mill rolling 15 to 24-in. girders and channles,	8,000
33-inch cogging mill,	13,000
33-inch finishing mill rolling 9 to 12-in. girders and channels,	7,500
28-inch blooming mill,	16,000
23-inch finishing mill rolling 4 to 8-in. girders and 4 to 6-in. angles,	6,500
10-inch merchant mill,	1,300
	152,800



BACKUS 12 H. P. GAS ENGINE.

"On the 33-inch cogging and 40-inch blooming mills, blooms are rolled for shipment, whilst the finishing mills are changing rolls for various sections, which explains the relatively higher tonnage on those mills. The 33-in. cogging rolls for both 23 and 33-inch finishing mills. The 23-inch mill changed 39 sets of rolls during September, each change taking one and one-half hours, thus 58½ hours must be deducted from the 26 days for this mill. The output is marvelous, and is only made possible by the splendid facilities for handling, chiefly by electricity.

"At Oliver's rolling mills the 9-inch wire rod mill, the day

I called, had turned out 410 tons of No. 2 wire rods in 24 hours. They very rarely come below this output, and often reach 420 tons. It is really a combination mill, consisting of 18 inch roughing train, a 12-inch mill, and four 9-inch finishing mills, so that four rods are finished and coiled at once. This mill is served by two furnaces, each about 45 feet long, having two pipes along the hearth, the full length 3 inches diameter, through which cold water is forced; on these the billets are placed and heated, and on a rack behind the furnace a large number of billets are placed and pushed slowly forward by an hydraulic pusher. By the time the billet reaches the door of the furnace it is thoroughly heated, and drops on to live rollers which convey it to the mill. The furnaces are heated by natural gas piped from a well 40 miles away. The billets are 4 inches square, and rolled into No. 2 wire rods. I was told the Illinois Steel Co., of Chicago, in their mill can roll 3,273 tons of wire rods per week—best day's output 728 tons. The enormous output of the American rolling mills cannot be equalled in this country. We have no such mills, nor is any one works able to make the steel for anything like the quantity. The large output is on simple straight forward work, and the mills are specially designed and arranged for this class of work. I have written to the best mills in this country, hoping to put their figures before you for comparison, but am sorry I cannot do so. The general reply is: 'Ours is a jobbing mill, and we frequently roll eight or ten different sections in the week; besides, we do not think we could get rid of so large a make, even if we rolled it.' The best mill in England with which I am acquainted has on one or two occasions rolled 50 tons of material in an hour on a good order. The proprietor says he thinks it would be capable of rolling 60 tons per hour. The output of this mill does not exceed 3,000 tons per week. In wire rod rolling, all the mills in England put together cannot equal the output of the Illinois Steel Co.

"In America the use of electricity is far more general than with us. For lighting, it is universal. For tram cars the trolley system is invariably used. It may be somewhat unsightly, but is cheap and effective; the cars run at a great speed, are under perfect control, and every town of any size runs them six to 15 miles in several directions. This finds an enormous amount of work for the electrical engineers, and both the Westinghouse Co. and General Electric Co. have large plants making motors for cars. Many works have adopted electric driving, some have a motor for each room, others one for each line shaft, some drive the large tools only with a motor, others a motor for almost every machine. At the Duquesne furnaces there are several electric appliances. At Duquesne and Homestead steel works enormous sums have been spent on the application of electricity. For instance, at the open-hearth furnaces you see no materials lying about; a locomotive brings up a train load of boxes ready filled with materials to be charged, an electric charger takes hold of these boxes, and puts them in the furnace, turns them half round, brings them back, and deposits them on truck empty —every operation electric, and only one young man to attend to it. Besides him there is a man who superintends, and a laborer to give a hand if necessary, and the boy on the platform who lifts the furnace door by moving the lever which regulates the hydraulic lift. A 50-ton furnace is charged in an almost incredibly short time. They have electric appliances for charging and drawing ingots and blooms, electric live rollers, cranes, bogies, dispensing with human labor to a marvellous degree. To be appreciated it must be seen. We lag behind in electric hoists, or elevators, we have not yet developed the tall buildings as they have in the States, and the few high buildings we have are residential flats, and seldom offices or places of business. Even in our large hotels there is an air of luxurious dignified leisure about the lifts which is exasperating after America.

"There are a few of our shops that have no better method of handling heavy materials used in engineering construction than rope blocks and hand labor! A few others have the old-fashioned, cumbersome, slow moving jib cranes, which formerly were necessaryy adjuncts in every machine shop. Others have travelling cranes driven by a square shaft, costly in repairs. Others have the comparatively modern rope crane. Others are adopting electric cranes. In America the electric crane is used in all the best works, both in the erecting shop, tool shop and foundry. It was a pleasure to see one electric crane pick up a locomotive and run with it to the other end of the shop at a speed far exceeding any rope crane. All works in the front rank will adopt the three-motor electric crane."

Our Consumption of Pig Iron.

For a great many years we have been in the habit of estimating the annual consumption of pig iron in the United States, an exact computation not being possible. In doing this we have made due allowance for imports, exports, and stocks on hand and unsold. We estimated the con sumption of pig iron in the eight years from 1889 to 1896 as follows, with which we place side by side the production in the same years:

Years.	Actual Production. Gross tons.	Estimated consumption. Gross tons.
1889	7,603,642	7,755,093
1890	9,202,703	8,943,338
1891	8,279,870	8,366,728
1892	9,157,000	9,303,315
1893	7,124,502	6,982,607
1894	6,657,388	6,694,478
1895	9,446,308	9,628,572
1896	8,623,127	8,275,774

It is a little too soon to fully estimate our consumption of pig iron in 1897, the import and export statistics of pig iron for the whole year not being as yet available, but a very close approximation to actual results is possible. We produced in that year 9,652,680 gross tons and imported say, 18,000 tons. The imports in the first 11 months were 16,327 tons. At the beginning of the year there were on the market 847,686 tons of pig iron. The total supply for the year was, therefore, approximately, 10,518,366 tons. Of this total supply we exported about 260,000 tons. The actual exports in the first 11 months were 236,502 tons. There were on the market at the close of the year 874,978 tons. Deducting these two items from the total supply we have 9,383,388 tons as the approximate consumption of the year. This quantity is about 245,000 tons less than the consumption of 1895 and not very much in excess of the consumption of 1892 It will be observed that we are not consuming as much pig iron as has been industriously represented.—[Bulletin.

A RECENT report from Moscow, Russia, says that the Government has fixed the price of steel rails for 1898 at 1.10 roubles per pood (56 cents per 36,112 pounds, or $34.72 per ton), instead of 1.60 roubles per pood (32 cents per 36.112 pounds, or $50.84 per ton), which has been the price for the last five years. The government railways offered the above price, and stated that if it were not accepted they would buy abroad, so the syndicate of the rolling mills had to accept it. The government decided to reduce the price of rails to prevent all the rolling mills that were making bar and other kinds of iron for the market from reconstructing their rolling mills for manufacturing rails exclusively, as the manufacture of rails has been so profitable that it brought some of the mills from 60 to 70 per cent dividends.

THE House Committee on Inter-State and Foreign Commerce has had an extended discussion of the bill for the creation of a Department of Industry and Commerce. There seems to be a general desire among the members of the committee for some measure of this character. The committee of the National Association of Manufacturers, to which this matter was referred by the association, has been doing excellent work in favor of the bill.

THE style of the firm name of Miller, Wagoner & Bentley, Columbus, O., and Chicago, has been changed to Miller, Wagoner, Fieser & Co., a new member having been added in the person of Louis F. Fieser, late of Reinhard & Co., bankers.

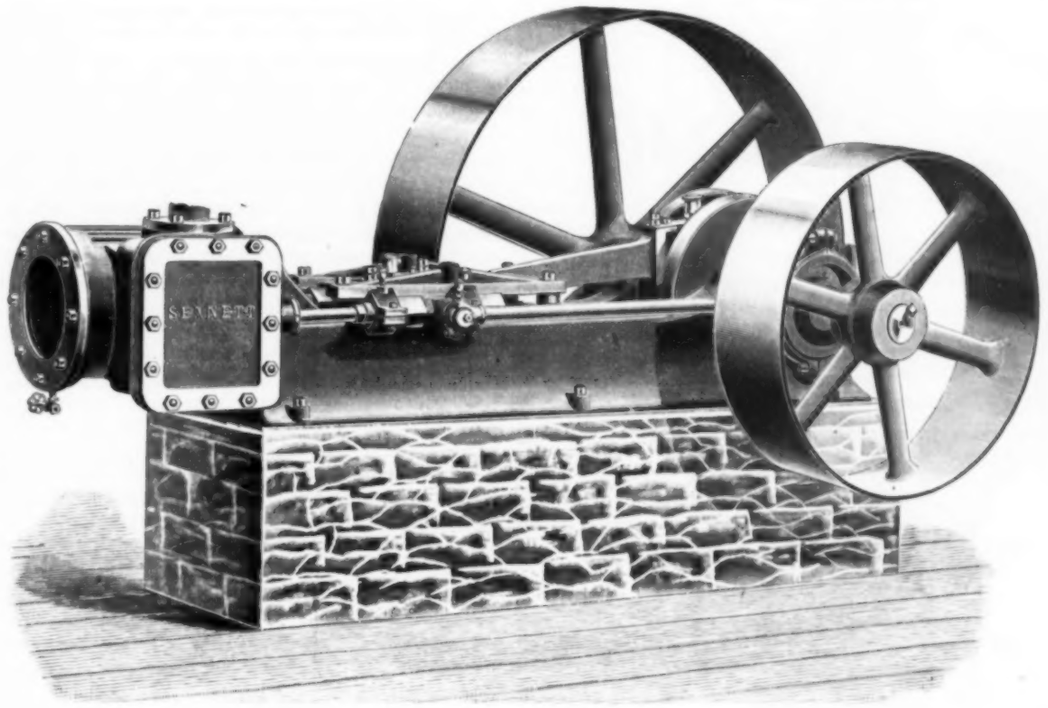
THE Reading Iron Co., Reading, Pa., is about building a new blast furnace on the site of one of its Keystone—formerly Bushong—furnaces. The dimensions will be 80x17 feet, 16 tuyeres, and four Massicks & Crooke's fire brick stoves, 19 feet 6 inches by 75 feet.

THE SENNETT ENGINE.

The accompanying illustration gives a view of the Sennett engine, made by the George B. Sennett Co., of Youngstown, O. It has been designed to embody all the good features which years of practical work have demonstrated to be serviceable and economical. The engine is of the "detached" type, having a solid steel center-crank shaft and being completely self-contained. The bed-plate is of one piece, together with one cylinder head and lower part of shaft boxes, which are in direct line with the center of the cylinder. It is strongly ribbed on the inside and so constructed as to give access to all parts.

The cylinder and steam chest are cast in one piece, from a mixture insuring a hard, smooth surface and toughness, giving greatest resistance to cutting and wearing action. All parts are made of best material, and good workmanship has been studied.

As indicating the range of power attainable, a test of a 10x12 engine at a speed of 250 revolutions is cited. It developed on the card 59 indicated h p., without sign of weakness. While this was an extreme test, entire reliability is promised for any length of time, from 20 to 40 h. p.



THE SENNETT ENGINE.

The plant of the George B. Sennett Co. is one of the most complete plants of its kind in the country. The buildings are well lighted and carefully arranged for turning out good work and for the economical handling of material. Cupolas and hoists are of the latest type. Narrow gauge tracks run throughout the entire plant, connecting the foundry, machine and blacksmith shops. Everything is so systematically ordered as to enable the company to place this engine on the market at a reasonable price and still make it first class in all details. Every engine is thoroughly tested and a guarantee is given of good service within the range of 20 and 40 h. p.

CAR and locomotive building: Reported that the Great Northern, Chicago Great Western and the Indiana, Illinois & Iowa, will soon buy locomotives. The St. Louis & San Francisco has ordered 10 locomotives from the Baldwin Locomotive Works. The latter has just completed four locomotives for the Soudan Railway in Egypt. The Minneapolis & St. Louis has ordered four six-wheel switching locomotives. W. J. Rainey, Cleveland, is in the market for 300 coke cars. The Kansas City, Memphis & Birmingham will buy 50 coal cars. Missouri Car & Fdy. Co. is building 50 cars for the Wells, Fargo & Co., and 50 for the Shreveport & Red River Valley R. R. Illinois Central will build 100 cars. Merchant's Despatch Transportation Co. will build 145 refrigerator cars. The Toledo & Ohio Central is in the market for 800 coal cars. The Missouri Pacific has ordered from the Missouri Car & Fdy. Co. 500 coal cars.

THE Brackin Mfg. Co., of Cleveland, has incorporated at Columbus with $25,000 capital stock. The company will engage in manufacturing and dealing in tools, machinery, mechanical supplies and the material for making the same. Charles E. Brackin, David B. Carpenter, Dudley Hard, W. E. Byrnes and W. C. McKay are the incorporators of the company. The Brackin pipe wrench is the new company's specialty.

THE Pittsburg Car Wheel Co. will soon begin the manufacture of car wheels at its old plant. Improvements will be made and equipment installed sufficient for the production of close to 500 finished wheels a day. In this connection the report that the P. H. Griffin Machine Works, of Buffalo, would remove to Pittsburg is pronounced unfounded. The purchase of ground adjoining the car wheel works at Pittsburg, in which P. H. Griffin is interested, was for the purpose of getting a railroad siding for the car wheel plant. Complete foundry and finishing equipment will be added. Heretofore wheels in the rough have been taken from Buffalo to Pittsburg to be finished, but the plant has been idle for some time.

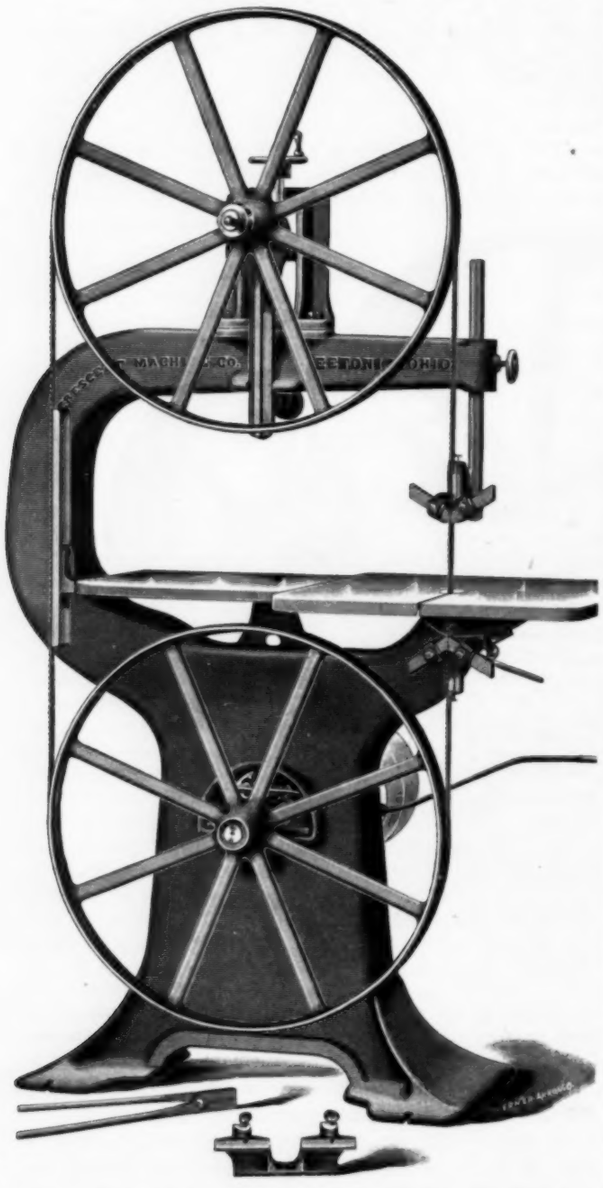
CONFERENCES are being held between the Wheeling Steel & Iron Co. and its employes over the wage scale recently submitted by the company. The agreement between them provides that either side shall give 30 days notice of a desired change. The company has given this notice and has submitted its scale which it says is higher than wages prevailing in other steel mills of like capacity. The men refused to accept. Pending conference, work goes on until the expiration of the 30 days. By that time it is believed the new scale will be accepted.

THE Senate Committee on Naval Affairs agreed last week to recommend an amendment to the Naval Appropriation bill, authorizing the Secretary of the Navy to enter into a contract with existing armor plants for supplying armor for the three battleships, the Alabama, Illinois, and Wisconsin, now in course of construction, at a rate not above $400 per ton for armor, including the nickel in it.

BAND SAW MACHINE.

The Crescent Machine Co., of Leetonia, O., has made the manufacture of band saw machines a specialty for a number of years. The machines the company is now putting out represent the study and practice of these years and are the result of an attention to details, the value of which is best appreciated, where experience is added to the correct theoretical solution of the problems involved. Symmetry and modern design particularly characterize the production of this company, and it has been a study also to secure rigidity and strength for the particularly heavy work coming within the range of the respective sizes.

The illustration represents the 32-inch machine, the largest



size. The band wheels are cast iron, carefully balanced, and covered with endless rubber bands, making a rigid wheel that stays permanently true. The upper wheel is adjustable in all directions. It can be angled latterally as well as vertically, to lead the saw in any desired path on the face of the wheels. It can be raised or lowered to accommodate saws of varying length. It is supported by a tension spring within the frame of the machine (on the 26-inch and 32-inch machines) to maintain a uniform tension on the saw, the amount of tension being regulated by a hand wheel. The table tilts to any desired angle up to 45 degrees, for bevel or conical sawing, and is held rigidly at any point by means of an eccentric lever. The guides are made with hard-wood surfaces, making injury to the saw impossible. The non-friction roller guides can be furnished at an additional cost when ordered. Tight and loose pulleys are provided, with shifter lever under the table where it is in easy reach, or it can be operated with the foot when more convenient to do so. The following are the details of the various sizes:

	20-inch machine.	26 inch machine.	32-inch machine.
Diameter of band-wheels	20	26	32
Face of band-wheels	1¾	1¾	1¾
Distance clear between saw and frame	20	25	31
Distance clear under guide when raised	7	10	12
Size of (tilting) table	20x24	20x24	24x28
Material used for table	wood	iron	iron
Height of table from floor	40	40	40
Diameter of belt pulleys	7	10	12
Width of belt to use	3	3	3½
Weight of machine	300	500	900
Length of saw blades (maximum)	10 ft. 1 in.	13 ft. 9 in.	16 ft. 5 in.

The ordinary speed should be 350 to 450 revolutions per minute. The 32-inch machine has the entire frame cast in one piece, cored out hollow. The 26-inch machine has the frame cast in two sections. The upper part is cored out hollow and firmly bolted to the base. The 20-inch machine has upper frame cast solid, bolted firmly to base. This and the 26-inch machine can be furnished with foot-treadle and suitable gearing.

Acid Open-Hearth Steel for East River Bridge.

The specifications for the steel towers and end spans of the New East River Bridge to be built between Delancey Slip, New York, and South 5th st., Brooklyn, have been sent out for bids. Between 8,000 and 10,000 tons of steel will be required. The proposals will be received at 2 o'clock on Monday, Feb. 28, at 49 Chambers st., New York, by Lewis Nixon, President of the Board of Commissioners. The steel shall be of the following grades: I. Steel for angles, plates and anchor bolts; II. Steel for pins and rollers; III. Steel for rivets; IV. Steel for castings. All specimens for testing, except rivet specimens, shall be not less than five-tenths of a square inch in section, and shall meet the following requirements respectively:

Grade.	I.	II.	III.	IV.
Maximum ultimate in lbs. per sq. in.	68,000	.....	56,000	.....
Minimum ultimate in lbs. per sq. in.	60,000	68,000	47,000	60,000
Minimum elastic limit in lbs. per sq. in.	33,000	35,000	30,000	.....
Minimum percentage of elongation in 8 in.	20%	17%	25%	.....
Minimum percentage of elongation in 2 in.	.....	.....	.....	20%

The specifications require that all steel shall be acid open-hearth made by a process and from a stock satisfactory to the engineer and made in mills of established reputation. When acid open-hearth steel is made in mills producing other kinds, no material will be accepted for this work unless especially made for it, and the specifications provide that such especially made steel shall be handled by itself or isolated in any manner required by the engineer to prevent the possibility of its being mixed with other kinds of steel.

The chemical requirements of all steel are that the amount of silicon shall be less than 0.1 per cent for grades I., II. and III., and less than 0.35 per cent for grade IV.; of phosphorus, less than 0.08 per cent; of sulphur, less than 0.03 per cent; and of manganese less than 0.5 per cent. Steel shall not be melted below from 0.12 to 0.15 per cent of carbon, nor recarbonized in a careless, uncertain or irregular manner. The manufacturer shall have an analysis of every melt, made by a chemist satisfactory to the engineer.

THE New York underground railroad project has been closely followed by steel manufacturers. The opposition, representing various transportation lines, elevated and others, is strongly organized, and is contending for a large bond by the contractors for the completion of the work. A re-argument on the $15,000,000 bond requirement was asked last week, and the decision has not yet been made.

THE Stillwell-Bierce & Smith-Vaile Co., of Dayton, O., manufacturer of turbine wheels, and other water machinery, feed water heaters, etc., reports business the past two months exceptionally good. It is customary with this company to close down in December and January, or reduce the working forces, but this was not the case this year. The net earnings for 1897 were $65,522, and during the year dividends aggregating $40,000 were paid allowing $25,000 to go to surplus. The company has taken some very large orders the past year.

COCHRANE HEATERS
FOR HEATING FEED WATER
FOR PURIFYING FEED WATER
USED BY MANY OF THE LARGEST AND BEST PLANTS IN THE U.S.
HARRISON SAFETY BOILER WORKS PHILADA. PA.
MANUFACTURERS.
FOR PURIFYING EXHAUST STEAM
FOR TAKING WATER OUT OF STEAM.
COCHRANE SEPARATORS

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

At the office of the Supervising Architect, Washington, D. C., sealed proposals will be received until 2 P. M., March 8, for furnishing all the labor and materials and fixing in place complete the boiler plant, low-pressure exhaust steam heating mechanical ventilating apparatus, cold and hot water supply system, etc., and fire pump required for the U. S. postoffice, court house, and custom house building at Milwaukee, Wis.

The Columbus (O.) Forge & Iron Co. has been incorporated with a capital stock of $20,000. The company will manufacture iron anvils, articles and devices composed principally of forgings, and carry on a general forging business The incorporators are David Buel, Wm. W. Franklin and W. D. Brickell.

John Galzer, manager Enterprise Machine Works, Rock Hill, S. C., wants a second-hand gear cutter (Whitin); also set of dies and a second-hand shaper, 14-inch.

W. P. Horner & Co., Danville, Va., ask quotations on emery wheels.

The Vanport Brick Co. has been chartered by Frank Moore, Edward B. Botsford, Alvin K. Riley, William T. Dunn, and George Rollings to manufacture brick at Vanport. The principal offices will be in Pittsburg.

The Standard Pneumatic Tool Co., capital $50,000, has been authorized to incorporate at Chicago. The incorporators are C. A. Williams, Frank T. Kinnare and Hugh J. Kearns.

The Davis Machine Co.'s incorporation has been authorized at Chicago; capital, $50,000. Incorporators, Geo. P. Blume, Henry B. Armstrong and Geo. H. Riddell.

The Southern Co-operative Foundry Co., Rome, Ga., capital $20,000, has been organized to build a foundry. C. E. Millican is interested.

New Construction:—

The Boston Gas Light Co. is erecting a new gas plant at Commercial Point in the vicinity of Boston. It consists of a building about 52 ft. wide and 185 ft. long, having brick side walls and brick partition walls dividing the building into three distinct parts, made up of a generator house, blower room, and condenser room. No wood is used in the construction of the building, and it is absolutely fire-proof. The floors are of steel throughout. The roof is covered with slate supported on steel roof trusses and framing. The contract for furnishing and erecting the steel roof work complete has been let to the Berlin Iron Bridge Co., of East Berlin, Conn.

The Riter-Conley Co., of Pittsburg, has received a contract for the construction of clinker bins and coal bins, together with all necessary machinery to equip the new works of the Castalia Portland Cement Co., of Castalia, O.

Samuel Diescher, Hamilton Bldg., Pittsburg, is receiving bids for the structural steel work on five new buildings to be erected by the Epping-Carpenter Co., of Pittsburg.

The Link Belt Machinery Co., Chicago, is having plans prepared for rebuilding the structure on the west side of Jefferson st., north of Washington st., recently destroyed by fire. The new building will be 178x50 ft., with an L 101x65 ft. Pressed brick and stone will be used for the exterior and the interior will be of mill construction, with steel girders and columns. The building will be equipped with passenger and freight elevators and steam heat, and work will begin as soon as weather will permit.

The recently incorporated Pennsylvania Car Wheel Co., of Pittsburg, will erect a new plant in Allegheny to cost $20,000. Machinery and general equipment will be needed. J. D. Rhodes, Pittsburg, is secretary.

A New Castle, Ind., dispatch says that a New York firm has bought the Sample farm of 52 acres near that city and that a car and railway supply company will build a plant.

The Ellis & Lessing Steel & Iron Co., Pottstown, Pa., has decided to construct an open-hearth steel plant.

Two factory buildings will probably be erected in Anderson, Ind., by the Anderson Brake Co., to be of brick and iron, with corrugated iron walls and roof. Equipment to include a 40-h. p. power boiler, band saws, miller lathes, drill presses, punch and shear machine, forge, etc.

It is reported that the Southern Indiana Railway will build a machine shop, at Bedford, Ind. The machine shop will be 90x175 feet, and will be supplied with all kinds of the latest and best machinery for repairing cars and engines.

At Cordele, Ga., Wm. Fitzsimmons is erecting a $7,000 factory of wood (iron covered) and brick. Equipment includes two 60-h. p engines, two boilers, complete furniture outfit, all kinds of bicycle tools and implements.

Beaver Falls, Pa., which has one of the largest and best equipped plants of the American Ax & Tool Co., is competing for the big plant which will be erected in accordance with the concentration plans of the company. In view of the report that Charleroi was favorably considered, a Beaver Falls citizen's commitee has secured options on a tract equal to two squares, most of it occupied with frame dwellings, and this will be put at the company's disposal, if it will go to Beaver Falls.

Additions, Enlargements, Removals, Etc.:—

The Belle City Malleable Iron Co. has about completed the erection of an additional foundry in connection with its plant at Racine, Wis., increasing the number of molders by 40. This is the third additional foundry building erected by this company within the past two years. The product consists of wagon and carriage stock malleables, railroad and agricultural implement castings, and general jobbing work.

The plans already drawn for the American Steel Casting Co.'s improvements at Sharon, Pa., provide for a brick power house 40x80. There will be new engines, new electric cranes, etc. The additions involve an outlay of about $200,000.

Deason & Son, of Spring Hill, Tenn., have removed their machine shop to Franklin, Tenn., and enlarged the plant.

The Triumph Mfg. Co., of Marion, O., is expecting to make additions to its plant.

The Robinson-Rea Mfg. Co., Pittsburg, will build a steel and iron addition to its plant, to cost $13,800.

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick

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Established 1841. Capacity, 60,000 Per Day; 18,000,000 Per Year.

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OTIS STEEL

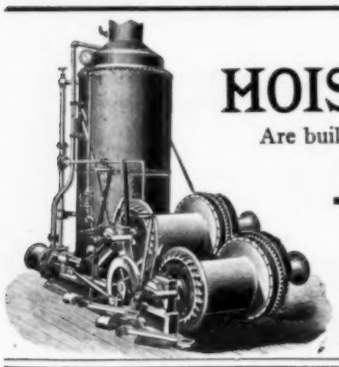
"OTIS" FIRE-BOX PLATES A SPECIALTY.

Flange Plates, Ship Plates, Tank Plates, Steel Car Axles and Forgings of all kinds.

Steel Castings from 100 to 75,000 lbs.

Head Office and Works, CLEVELAND, OHIO.

Agencies: NEW YORK, 97 Cedar St. CHICAGO, Old Colony Bldg.
ST. LOUIS, 516 N. Third St. WASHINGTON, Kellogg Bldg.
MONTREAL, J. G. Sibbald, 3 Windsor Hotel.
SAN FRANCISCO, John Woodlock, 26 Beale St.



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Are built to Gauge on the Duplicate Part System.
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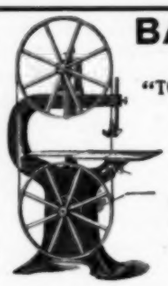


BAND-SAW Machines, "TO BEAT THE BAND."

Belt Power and Foot Power.

Our Machines have Modern Improvements. Made in three sizes. Circulars and prices on application.

CRESCENT MACHINE CO.
LEETONIA, O.
No. 4 Front Street.

Subscribe for The Iron Trade Review.

Fires and Accidents:—

A fire at Singer, Nimick & Co.'s steel plant, Pittsburg, Feb. 10, caused damage to the extent of about $2,500. The blacksmith and carpenter shops were totally destroyed and the gas house badly damaged.

A fire in the works of the Atherton Machinery Co., Patterson, N. J., destroyed machinery estimated as worth $10,000.

General Industrial Notes:—

The Sargent Co., of Chicago, reports a large business in railway supplies in the past few weeks. Orders for the new Diamond "S" shoe are coming in rapidly. This shoe is manufactured of cast iron with an insert of expanded steel, giving great friction and long life to the shoe, without injury to the tire. Tests on a large number of railroads have given unifom satisfaction. W. D. Sargent, the vice-president and general manager of the Sargent Co., has just returned from England and the Continent, where he has been ennaged in introducing the Diamond "S" brake shoe. Notwithstanding the proverbial conservatism of foreign railway managers in respect to American inventions, several of the railroads in England are already using these shoes and the prospect for a large extension of this business is flattering. The Sargent Co. has recently published the second volume in its series on the Diamond "S" brake shoe, giving the results of the tests conducted on the brake shoe testing machine at the shops to the Westinghouse Air Brake Co., at Wilmerding, Pa.

The Eliza Furnace, of Laughlin & Co., Ltd., Pittsburg, are to be greatly improved. The smaller stack, 75x15 feet, will be rebuilt and made 100 feet high. The other two will have their blowing capacity increased, and improved charging apparatus will be installed. All will be brought to the highest efficiency by the extensive campaign of improvement that will be entered upon soon. One of the 80x20 stacks has been constantly active for five years, producing close to a half million tons of iron in that time.

The Cleveland City Forge & Iron Co., Cleveland, has taken an order for sugar-making machinery to be shipped to Hawaii.

The Pittsburg Wire Co. has elected the following officers: President and treasurer, Thomas Walker; secretary, James A. Farrell; directors, Alex. Dempster, Thomas Walker, James H. McCrady, Joseph Kountz, and Thomas W. Fitch. The company has a record of 315 working days in 1897.

E. S. McLain & Son, Pittsburg, have been made general selling agents for the fire brick of the Wm. Stuart Fire Brick Co.

A break-down of one of the blowing engines at the Hannah Furnace, of the Mahoning Valley Iron Co., Youngstown, has compelled the banking of the furnace.

The Harvey Steel Car Co., of Harvey, Ill., has been placed in the hands of receivers on a judgment for $58,000, secured by Lobdell, Farwell & Co., of Chicago, on default of interest on a $100,000 bond issue.

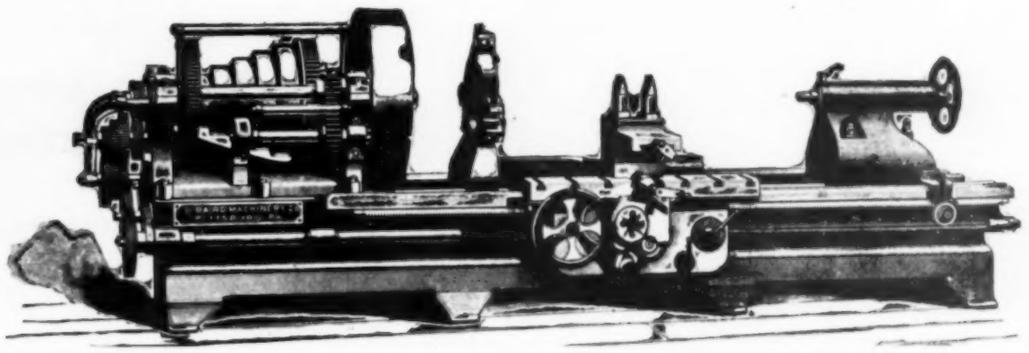
The blast furnace of the Warwick Iron Co., at Pottstown, Pa., in the week ending on January 30, made 1,440 tons. During the preceding week the furnace put out 1,410 tons, breaking the record for the furnaces of the Lehigh and Schuylkill valleys. About a year ago improvements were made and it is now one of the best furnaces in Eastern Pennsylvania.

Great destitution exists at New Castle, Del., among the families of the men who were employed at the Delaware Iron Works (Morris, Tasker & Co.) before they were closed. It

U. BAIRD MACHINERY CO.,

PITTSBURG, PA.,

Machine Tools and Supplies.



—Write for List "B" of Second-Hand Tools.—

THE ANDREW PATENT GRIP SOCKET.

Holds straight or taper shank drills perfectly rigid. Protects the Shank until the drill is completely worn out. Old taper Shank drills with tangs broken off used just as well as new drills. Beware of infringements.

M. L. ANDREW & CO.,
60-62 Elm St., Cincinnati, O.

SILICA BRICK
For Iron and Steel Furnaces, Glass Furnaces, etc.
SPECIAL SHAPES MADE TO ORDER.
DIAMOND FIRE BRICK WORKS,
AKRON, OHIO.

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Is one of the requisites of satisfactory results. In the expansion of business which is now noticable in every section of the country, advertisers who have made themselves regularly prominent in the past twoyears will be first to reap the rewards of persistent publicity-

OUR NEW CATALOGUE "O"
is now ready—illustrating improved designs. . . . .

SHEARS for plates, bars and structural shapes.
PUNCHES, STRAIGHTENING ROLLS,
PLATE PLANERS, BENDING ROLLS.

Send for it. **HILLES & JONES COMPANY,**
908 Church St., Wilmington, Del.

SEND FOR IT

is said that there are over 1,000 persons in the town who will have to be helped through the winter. There are also a great many poor people in Wilmington, Del., who are dependent on charity.

Eighteen hundred tons of Alabama coke, the largest shipment ever made in that direction, left Birmingham on Feb. 8 for Mexico, by way of Pensacola and other shipments are to follow. Alabama coal has been moving to Mexico steadily and in large quantities for two months, several railroads having been compelled to put on extra freight crews to handle the traffic, but the export coke business from Birmingham is a new feature of trade.

The Ohio Steel Co. has decided to engage in the manufacture of steel rails. When the plant was erected a department for the manufacture of steel rails was partly completed. It has now been decided to finish it, and it is expected that in from 60 to 90 days the company will be able to take orders.

Frontier Iron Works Detroit, Mich., have ready for the market four sizes of their new Frontier vertical gas and gasoline engines, and other sizes will be ready about March 1. This engine is especially designed for powers ranging from 1 to 10 h. p. Above this size the company builds two-cylinder Frontier tandem in sizes from 10 to 100 h. p. The company reports a largely increased demand for both types, especially for pumping and mill work.

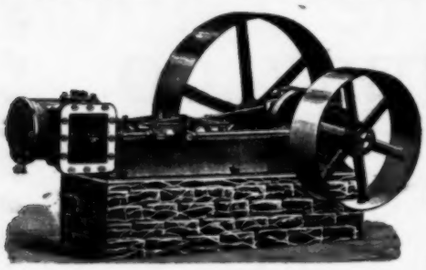
James Bonar & Co., Pittsburg, Pa., have received an order from the Shenango Valley Steel Co., New Castle, Pa., for 5,000 h. p. Pittsburg feed-water heaters and purifiers, consisting of two heaters of 2,500 h. p. capacity each, for its new tin plate plant, which is claimed to be the largest in this country. They are also furnishing them with eight 8-in., three 14-in., and one 16-in. direct steam separators to be attached to the throttle valves of engines. James Bonar & Co. report increased business in their other specialties.

The United States Car Co.'s Works, at Urbana, O., were sold Feb. 2, under foreclosure proceedings instituted by the Central Trust Co., of New York, to satisfy a judgment of $2,019,539. The purchaser is Samuel M. Dix, of Chicago, treasurer of the Illinois Equipment Co.

Officials of the Carnegie Steel Co. made a tour of inspection of the company's plants and other industrial establishments in the Pittsburg district last week.

The Enterprise Boiler Co., Youngstown, O., now manufactures galvanizing kettles, builds galvanizing plants and

The Geo. B. Sennett Co., Youngstown, Ohio,



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Sennett Slide Valve Engine.

A well made and durable center crank engine of from 20 to 40 H. P. The design is thoroughly modern and all parts are made in duplicate. Engines kept in stock ready to run. Catalogues or prices willingly furnished. Among our other specialties is the

SENNETT COMPRESSION COUPLING

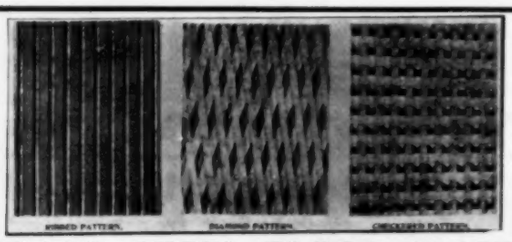
(See advertisement next week).

Foundry contracts solicited for castings from 10 to 1,000 lbs. each.

"Metallurgy of Cast Iron,"

By THOS. D. WEST; 107 engravings, 583 pages. Just issued. A valuable work to Founder, Molder, Draughtsman, Designer, Technical School Specialist. Chemistry of Iron; cheaping of mixtures; the effect of the metalloids in changing the grade of iron; latest improvements in cupola construction and practice—all are fully covered. Price $3. Sent postpaid on receipt of price, by *The Iron Trade Review Co.*, Cleveland, Ohio; 1142 Monadnock Block, Chicago, Ill.

James M. Swank, author of "Iron in All Ages," and editor of the *Bulletin* of The American Iron & Steel Association, in reviewing "Metallurgy of Cast Iron," says it is "One of the most valuable publications relating to the manufacture of iron castings, that has ever, to our knowledge, been issued in this or any other country."



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Have, for some time, been in quite extensive use, giving the best of satisfaction, and have no equal for engine room and boiler room floors, engine steps and platforms, stair treads and landings, gutter crossings, covers for sidewalk openings, and all places exposed to severe wear or where a roughened surface is desired to prevent slipping.

J. F. CORLETT, Sales Agent, Perry-Payne Bldg., CLEVELAND, O.

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Is being done where the

PNEUMATIC PYROMETER

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WE INVITE CORRESPONDENCE.

UEHLING, STEINBART & CO., Ltd.,

61-63 Mulberry St., NEWARK, N. J.

erects complete outfits for tinning cast iron. Its process for galvanizing makes it possible for those who have a limited amount of work, to do it themselves at low cost. The Enterprise Boiler Co. also manufactures boilers, stand pipes and heavy plate work of all kinds.

The case of James Todd and others against the Firth-Stirling Steel Co., and C. G. Wheeler, came up again before the Philadelphia Supreme Court, in Philadelphia, last week. Todd claimed to be the author of the "Sterling double special" steel process, which, he charged, was used in the manufacture of all the Sterling projectiles sold to the United States Government. On the strength of this claim, he sued for a royalty of $30,000. On the trial of the case in Pittsburg, Todd got a verdict, but it was upset by the Supreme Court 11 months ago. The Supreme Court held that the use of the same general "process" did not necessarily produce the same kind of steel, which depended upon the chemical constituents. Recently on the strength of analyses found in defendant's laboratory books, plaintiff sought to have the decree modified, but the court sustained the defendant's claim that even if its steel is the same as Todd's, it is not subject to royalty payments, since a similar steel has been made and marketed by others.

Car trust 6 per cent gold bonds to the amount of $500,000 have been issued by the Pittsburg, Bessemer & Lake Erie Railway, and the issue has been taken by the German National Bank of Allegheny. The road is about to place another order for steel cars.

Preparations are being made to start No. 1 stack of the Paxton furnaces, at Harrisburg. The furnace is undergoing repairs and considerable work is to be done. It has been idle since Aug. 12, 1896. No. 2 furnace, which was started last week, has been doing very well.

The Wisconsin Steel Co., the new organization which has taken the West Superior steel plant on behalf of John D. Rockefeller, and other bondholding and general creditor interests, representing in all about $1,750,000, is having a careful canvass made of the possibilities of operating the plant. It will require $1,000,000 to make it thoroughly modern, and while it is believed steel can be manufactured at a reasonably low cost, it is a question whether enough can be marketed in the districts tributary to the plant to guaranty profitable operation.

It is reported that P. H. & F. M. Root Co.'s foundry, at Connersville, Ind., has been bought by F. J. Weber.

The Long & Alstatter Co., of Hamilton, O., is just furnishing for the Johnson Co., of Lorain, O., a heavy steam driven billet shear, which is the third machine of that type furnished to this company.

EXCURSIONS TO THE SOUTH.

Special Rates to Mobile and New Orleans via Pennsylvania Lines.

From Feb. 14th to 21st, inclusive, special excursion tickets to Mobile and New Orleans account the Mardi Gras festivities will be sold via Pennsylvania Lines. Return limit will include March 19, enabling excursionists to spend several weeks in the South. The low rate is open to all. For full particulars about the cost of tickets, time of trains, etc., apply to nearest Pennsylvania Lines Ticket Agent.

TO CHATTANOOGA.

Reduced Rates via Pennsylvania Lines.

Chattanooga, Tenn., may be visited at low fare via Pennsylvania Lines, Feb. 20th and 21st, when special excursion tickets will be sold over that route account the National Educational Association Department of Superintendence, good to return until Feb. 28. Anybody may purchase the reduced rate tickets of Pennsylvania Lines Ticket Agents, who will answer inquiries on the subject.